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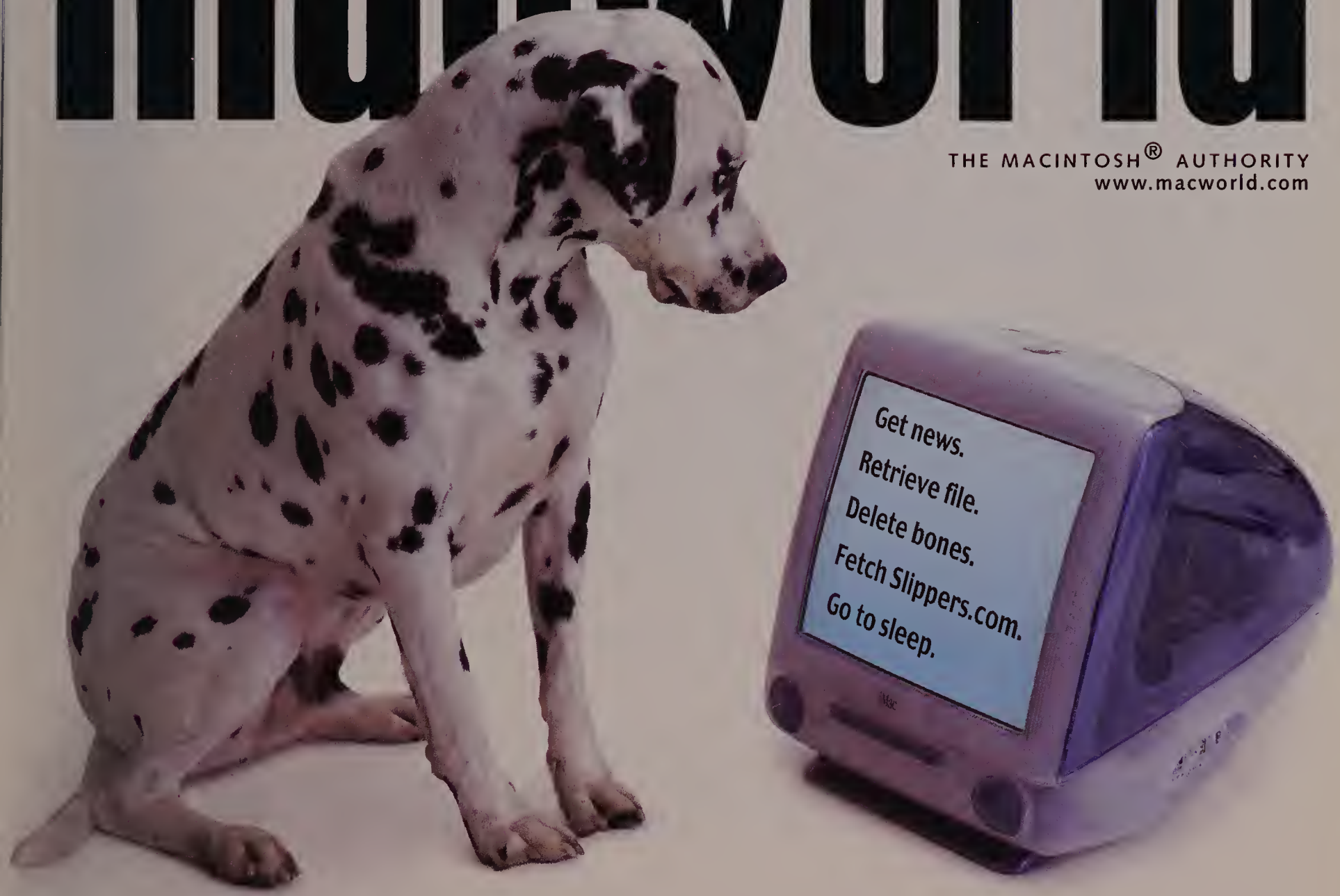

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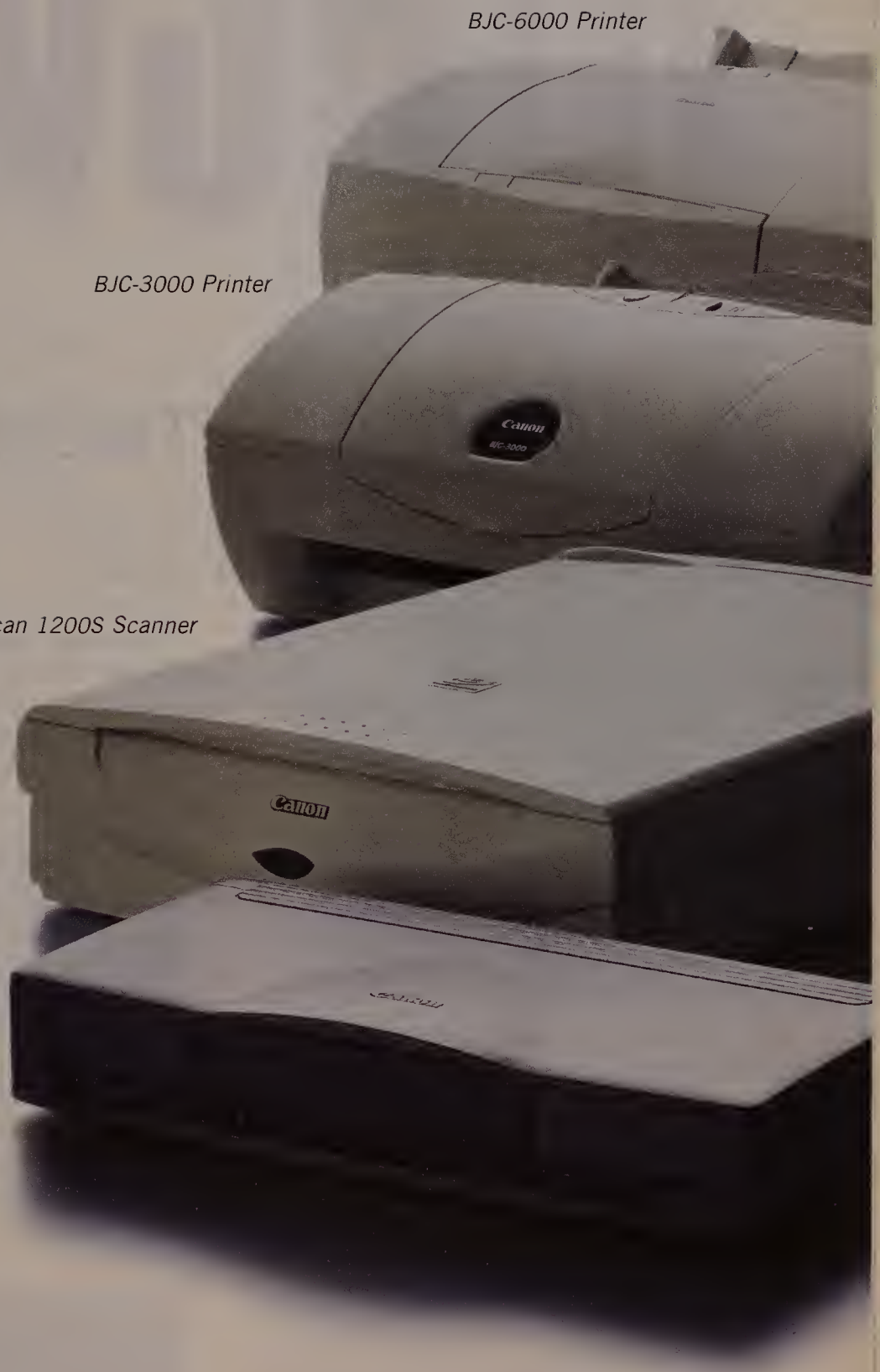

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Macworld

Incorporating MacUser

Speak up! Mac voice recognition is here, page 66.

Features

Cover Story

66 Listen Up

BY DAVID POGUE Speech recognition for the Mac has finally arrived. Here's how it works, and a tour of the products that make it happen—plus a review of IBM's ViaVoice.

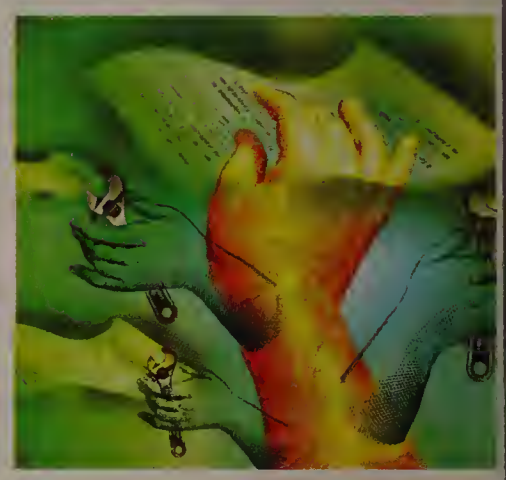
74 Bridge the Gap

BY CHRISTOPHER BREEN Want to hook up a new Mac to existing peripherals, or an older Mac to recent USB devices? Our connectivity guide shows you how.

82 Cut Loose LAB TEST

BY CHRISTOPHER BREEN Your Mac can roam free with Apple's wireless AirPort technology—follow our expert tips and set up a wireless network in a jiffy.

Snip that cord and go wireless with AirPort, page 82.



XTend your reach in QuarkXPress, page 93.

Create

Print

93 Extend Your Efficiency in QuarkXPress

BY DAVID BLATNER Make XPress work the way you want with XTensions.

Web

96 Flash with Substance

BY FRITH BREITZER Bring your ideas to life with Macromedia Flash.

Web

99 Animation in a Flash

BY DAVE McFARLAND Keep your creativity flowing: let Macromedia Flash handle the grunt animation work.

Is Apple gearing up for a Net appliance? page 25.

News

25 Are Internet Devices in Apple's Future?
Apple may be mulling an entry into the Internet-appliance market. Analysts say the move could make sense.

26 Adobe Puts It All Together
Updates to Illustrator and GoLive continue Adobe's migration toward interoperable applications.

28 Product Watch
New products for your Mac, including a new line of printers from Hewlett-Packard and a 42-inch plasma display from NEC.

28 Pantone's More Colorful World
The color-standards provider has updated its reference products for graphics professionals.

28 The Whole World in Your Hands
Symbian's Quartz computing platform brings multiple applications under one roof.

ON THE COVER
Photograph by Mark Johann; Cisco provided by Bow Wow Productions

Opinion

17 Letters

23 The Vision Thing
BY ANDREW GORE Computer, speakable items are not enough.

61 The Game Room
BY CHRISTOPHER BREEN Mastering the subtle art of the Deathmatch.

172 The Desktop Critic
BY DAVID POGUE OS X is just around the corner. How scared should we be?

12 How to Contact Macworld

Get cozy with the new iBooks, page 36.

Secrets

89 The Mac for Many
BY JOSEPH SCHORR Secrets for maintaining your multiple-user Mac.

91 Quick Tips
BY LON POOLE Tips, tricks, and shortcuts.

Reviews

32 ♦♦♦♦½ **Apple PowerBook G3/400;**
♦♦♦♦½ **Apple PowerBook G3/500**
High-end portables

34 ♦♦♦♦ **Newer Technology Maxpowr G4 350MHz;**
♦♦♦♦ **Newer Technology Maxpowr G4 400MHz;**
♦♦♦♦ **Powerlogix PowerForce G4 350MHz;**
♦♦♦½ **Powerlogix PowerForce G4 400MHz;**
♦♦♦♦ **Sonnet Technologies Crescendo G4 PCI 350MHz;**
♦♦♦♦ **Sonnet Technologies Crescendo G4 PCI 400MHz;**
♦♦♦½ **XLR8 Mach Carrier G4 350MHz;**
♦♦♦½ **XLR8 Mach Carrier G4 400MHz**
G4 processor slot upgrades

36 ♦♦♦½ **Apple iBook;**
♦♦♦ **Apple iBook Special Edition**
Consumer portables

38 ♦♦♦♦ **Carrara**
3-D–modeling application

40 ♦♦♦½ **Kodak DC290;**
♦♦♦ **Olympus C-2020 Zoom**
Two-megapixel digital cameras

41 ♦♦♦♦½ **MacDrive 2000;**
♦♦♦♦ **MacOpener 2000**
Disk-mounting programs

42 ♦♦♦½ **Palm IIIc**
Color handheld organizer

44 ♦♦♦♦½ **4th Dimension Standard Edition 6.5.3**
Relational-database application

44 ♦♦♦♦½ **Sid Meier's Alpha Centauri**
Civilization-building game

46 ♦♦♦ **Epson Perfection 1200U Photo**
Photo scanner

46 ♦♦♦½ **Mixman Studio Mac 1.1**
Real-time sample mixer

48 ♦♦♦♦ **Quake III Arena**
First-person action game

49 ♦♦♦♦ **ArtMatic 1.2**
Art synthesizer

50 ♦♦♦♦ **ImagePort**
Quark XTension

52 ♦♦♦½ **Chessmaster 6000**
Chess tutor

54 ♦♦♦½ **DoorStop Personal 1.1**
Personal firewall

56 ♦♦♦♦ **CelView 2.0**
Terminal-emulation software

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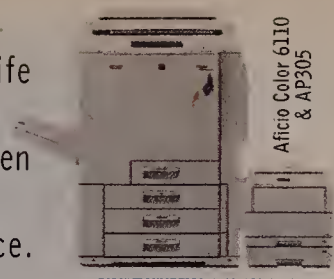

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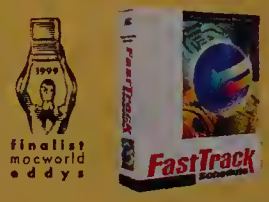

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***Multimedia Software Engineers* • *Chicago* •** An innovative client is seeking Multimedia Software Engineers. Proficiency in Macromedia Director, Lingo, Dreamweaver or Authorware is required. You will be working in a team environment that offers career growth and an excellent compensation package.

***Mac/PC Gurus* • *Providence* •** RI company is looking for Mac/PC gurus with extensive knowledge of networking, operating systems, and cross-platform connectivity. The ideal candidate will be familiar with hardware and software for upgrades and troubleshooting.

***Typesetter* • *Providence* •** A Rhode Island printing company is looking for a computer-based typesetter. Expertise in PageMaker is required. Experience with Quark, Photoshop, Illustrator, Freehand, the ability to convert files from PC to Mac, rip, and perform color separations is also needed.

***Web Writer* • *Boston* •** The Web Writer is responsible for feature, program and promotional content throughout the client's site. He/she will also manage other web editorial projects, serving as both writer and creative project manager. Familiarity with HTML and associated authoring software and tools as well as 5+ years in business communications is required.

***Art Directors* • *Philadelphia* •** Center City marketing agency has an ongoing need for Art Directors. Positions require excellent knowledge of Illustrator, Photoshop and QuarkXPress plus 3-5 years design or art direction experience in an agency environment.

***Site Author* • *New York* •** Work on the internet's best and most attractive auction site! You must be an expert in HTML and at least one of the following: JavaScript, DHTML/CSS, Flash, streaming media, JSP, QuickTime VR, multiple-platform support. Real-world web development experience on at least one commercial site is desired. The successful candidate likes working on a team, doing intense and rewarding work, and being around cool, creative and intelligent people. Experience with graphics software or server-side development is helpful.

***Mac Tech Support* • *New York* •** Growing publishing company is looking for a Mac Tech w a minimum of 2 years of experience. Candidates must have strong knowledge of Quark, Photosho and Illustrator. Knowledge of NT, HTML, UNIX, a FileMaker Pro is a plus.

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***Print Designer* • *Baltimore* •** A small suburban ad agency seeks a Print Designer who displays grace under pressure to handle everything from proofing to design to pre-press production. You must be a QuarkXPress expert, exhibit acute attention to detail and have the ability to work independently.

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Letters

X Marks the Spot

OS X REPRESENTS A COMPLETE bastardization of the Mac interface ("Mac OS X Unveiled!" March 2000). Nearly everything about the new user interface is repulsive, counterintuitive, gimmicky, and unnecessary. The worst feature of the new interface is its nauseating motion. No one wants throbbing buttons, oozing icons, or sliding windows.

There are other problems, too. For example, the window control buttons are identical and very small. The Mac OS used to represent a truly easy-to-use, logical, and elegant interface. Apparently, Apple's lust for dollars and newfound bravado, arrogance, and profitability have made the company lose its focus.

STEPHEN R. SAUER II
Oxford, Ohio

Top Secret OS 9

THANK YOU FOR YOUR FEATURE ON OS 9 ("Top Secret OS 9," March 2000). I'd been pulling my hair out for two weeks because I could not get Netscape Communicator 4.7 with 128-bit encryption booted up. I downloaded it a second time—almost a two-hour undertaking—just to experience the same problem. But then *Macworld* told me to remove the Talkback folder from the Communicator folder. Hats off to you, *Macworld*—I'm back on the Internet.

JERRY SCHUNKE
Antigo, Wisconsin

Quicken Ain't So Swift

I APPRECIATED YOUR ARTICLE ON using Quicken 2000 ("Easy Money," March 2000), but you failed to mention one of Quicken's great failings: its inability to divide in the Portfolio view.

If you use Portfolio to keep track of your stocks and a stock splits, the Average Cost Per Share function doesn't calculate the average cost per share. Quicken's fix is simply telling users to do the math themselves. What's next? Rather than printing through my printer, might Quicken suggest that I get a pencil and paper and simply jot words down as I read them off the screen?

ANDY MILDER
Santa Monica, California

I FEEL QUICKEN 2000 IS THE MOST wretched kind of bloatware. Intuit took a product that once did something well and then added a lot of bells and whistles, and now the program no longer does the thing that made it so wonderful.

I've used Quicken for years, since my old Apple IIGS. I don't need a monster program, but there is no basic version for Macintoshes—only the Deluxe version. I was forced to upgrade when Quicken SE 96 turned out to be not Y2K compliant.

My credit union insists that I'm downloading QIF files, but Quicken 2000 doesn't recognize them, even though I've updated it as you suggested. Once I enter the data by hand and begin to reconcile (the only reason I have the program in the first place), I am faced with what Intuit's extremely limited tech support calls a "known issue": since only the first three digits of a five-digit check number are shown in the reconciliation window, all my checks appear to have the same number. I don't call this progress.

DAVID HART
Anchorage, Alaska

Pressing the Point

GALEN GRUMAN'S REVIEW OF Adobe PressReady missed most of what the product does (*Reviews*, March 2000). He incorrectly thinks the program is another low-end PostScript translator for ink-jet printers.

PressReady is the first affordable color-printing tool for designers that accurately simulates CMYK print colors as they would appear on a Heidelberg or other press.

The program provides huge cost savings over other proofing methods such as Iris prints, film prints, and Matchprints. In our office, we've found that our Epson 3000's PressReady proofs are amazingly close to our final output. This has saved us hundreds of dollars in incorrect film.

Gruman entirely missed the fact that PressReady simulates Pantone spot colors without forcing designers to load an entirely different set of Pantone simulation color files into Adobe Illustrator or QuarkXPress.

continues

DAVE CUTLER

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PressReady also simulates printing to coated and uncoated paper stock—a real-world printing-press concern—and applies ink-dot gain accordingly. It lets us give our clients proofs that correctly set their expectations for color.

With all these features, PressReady is a steal with a street price of around $200. Heck, it paid for itself during the first job by eliminating the need to rerun one set of film and Matchprints.

Gruman's review cast doubt on a very exciting product for designers. PressReady can deliver fool-proof Portable Document Format files for high-end color work. It should have received four mice (not five, only because it's not a stand-alone raster image processor that a workgroup can use).

DAVE DAHLBERG
Bountiful, Utah

Your CADdish Review

AFTER READING CHARLES SEITER'S review of DenebaCAD 2.0, I came away unable to discern the basis for several of his perceptions (*Reviews*, March 2000).

I take issue with his insinuation that contracts are won by dazzling renderings at presentations. While effective renderings do help win a client's approval, the strength of a design is the real deal maker—or breaker—for modern architects. CAD is not the same as rendering.

I was particularly baffled by the reviewer's assertion that DenebaCAD's lack of a scripting language is not problematic because "today's processors deal with complex objects at lightning-fast speeds, negating the need for such languages." Savvy CAD professionals realize that the value of a scripting language lies not in processor speed but in the design flexibility it provides its users.

Every leading CAD application—AutoCAD, MicroStation, VectorWorks, and ArchiCAD—has moved to object-based scripting languages. Advice counter to this trend further exposes an utter lack of understanding of today's CAD technology and breaches the trust of *Macworld*'s well-informed readership by suggesting that inferior functionality is offset by processing speed.

Lastly, the reviewer displays a lack of familiarity with the CAD-software market by suggesting that DenebaCAD's only direct competitor is one that costs five times as much and takes longer to master. This is truly irresponsible journalism. There are several similarly priced CAD programs with a comparable learning curve that not only adequately compete with DenebaCAD 2.0 but also completely outperform it.

BARTON GREER
Diehl Graphsoft, Columbia, Maryland

Diehl Graphsoft produces VectorWorks, a competing CAD program.—Ed.

Steely Interfaces

I COMPLETELY AGREE WITH DAVID Pogue's assessment of Apple's interface direction ("Why Stainless-Steel Software Stinks," *The Desktop Critic*, March 2000). It seems to me that the popularity of successful Apple products can be summed up in one word: *simplicity*. The concept that has set Apple apart from its competitors is its ability to put a simple, friendly, intuitive face on a potentially intimidating technology.

As Windows has evolved in the direction of the Mac, the Mac has unfortunately gained some of the baggage that makes PCs so difficult. As the new Mac hardware delivers on the promise of simplified technology, the new software seems to be moving in the opposite direction. I'm sure that some focus group was impressed with the QuickTime Player's cluttered, oversize interface, but I was sad to see the old, simple one go.

THOMAS HALL
Phoenixville, Pennsylvania

I AM VERY DISAPPOINTED IN DAVID Pogue's tone. First, I like the look of the brushed–stainless-steel windows. I think they have a more elegant look-and-feel. But my disagreement goes further than mere aesthetics. If you look at the screen shot of the Mac OS X desktop on page 70 ("Mac OS X Unveiled!"), you can see a new QuickTime window with the standard Mac OS X controls in the upper corners. Also, the annoying thumbwheel volume control has been replaced with an easier-to-use sliding button.

Apple is listening and making the necessary changes to its software. If the folks in Cupertino are feeling a little arrogant, I say let them! They've earned it.

CHRIS TATIAN
Portland, Maine

The Man behind the App

I WAS EXTREMELY DELIGHTED TO see Sustainable Softworks' IPNetRouter 1.4.3.3 win an Editors' Choice award in the network-utility category ("The 15th Annual Editors' Choice Awards," March 2000). I have used IPNetRouter for over a year, and it's a great product.

But that's only half the story. Peter Sichel, the man behind the application, works in a way that should be copied—he creates well-written applications that don't hog memory or processing power. And he lets users try out full working versions for a period of time. His software is backed by a philosophy of honesty and humility and a support system that can't be beat. Peter has always responded to my e-mail questions within 24 hours.

Peter's product made life at our little union office much easier—no more yelling into the next office to make sure someone else wasn't already hooked up on their computer before going online.

Thank you, *Macworld*, for recognizing a great application and a great programmer.

ERIC ODIER-FINK
Brooklyn, New York

Free Macs for All?

I'VE JUST HEARD THAT APPLE IS not allowing FreeMac.com to distribute free iMacs, even though FreeMac.com is offering to pay full price for them.

I have the ability to purchase an iMac, but the single mother next door doesn't. FreeMac.com's program would have brought many new people to the Mac platform without Apple having to do anything.

STEVE WATSON
Dallas, Texas

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CORRECTIONS

The illustration for "Getting Into InDesign," (Create, March 2000) was created by Gordon Studer. m

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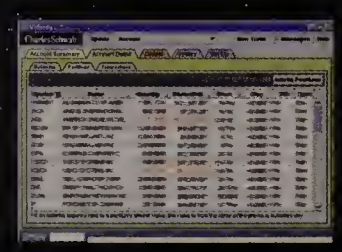

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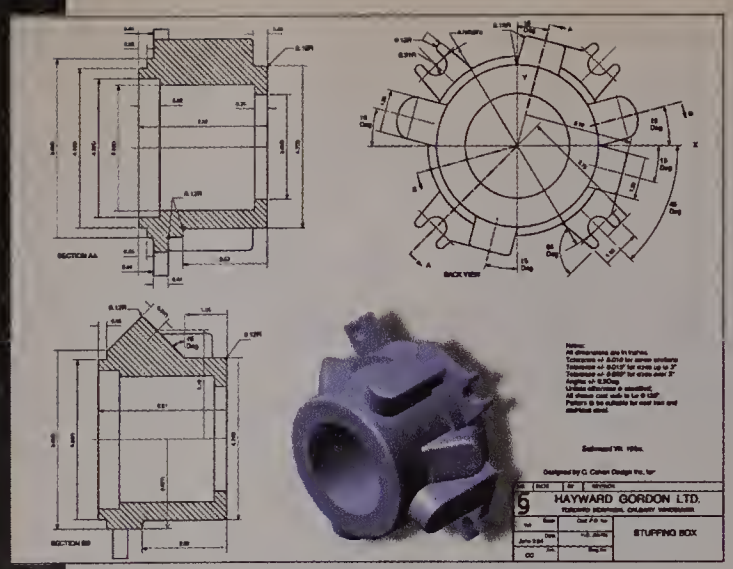

Carlos Cohen, C. Cohen Designs Inc., Toronto, Canada; Rendered with RenderWorks

Introducing VectorWorks

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Charles Duncan, Pty. Ltd.

Roberto Candusso, Arquitetos Associados, Sao Paulo, Brazil

After 14 years of constant research and development, Diehl Graphsoft is proud to introduce VectorWorks—the next generation of MiniCAD. VectorWorks improves MiniCAD's proven CAD technology and merges new state of the art Object-Based design philosophy. This integration makes you more productive without sacrificing flexibility and control.

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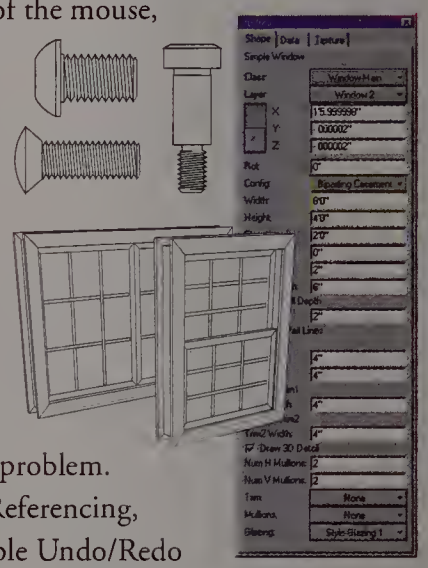

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The Vision Thing

by Andrew Gore

Speak Easy

SURE, YOU CAN TALK TO YOUR MAC—BUT WHO KNOWS IF IT WILL UNDERSTAND YOU?

ON A FINE SUNNY DAY, A man sits down at his computer and goes to work. But instead of grabbing the mouse or pecking at the keyboard, he leans into a microphone and begins to speak.

"Computer, open 'Vision Thing' for June."

I'm sorry, Andy, but I can't do that.

"Computer, why not?"

I don't understand.

"Computer, open the document seventeen dot zero six Vision Thing dot A G."

I'm sorry Andy, but I can't do that either.

"Computer, why not?"

I don't understand "the document seventeen dot zero six Vision Thing dot A G."

"Computer, open the volume The Iron Age."

Volume The Iron Age is open.

"Computer, open the folder Vision Thing Stuff."

Folder Vision Thing Stuff is open.

"Computer, open the document seventeen dot zero six Vision Thing dot A G."

Document seventeen dot zero six Vision Thing dot A G is open.

"Computer, start ViaVoice."

I'm sorry Andy, but I can't do that.

Pause.

"Computer, WHY NOT?"

I don't understand "ViaVoice."

"Computer, close the folder Vision Thing Stuff."

Folder Vision Thing Stuff is closed.

"OK. Computer, open the folder Applications."

Folder Applications is open.

"Computer, start ViaVoice."

ViaVoice started.

Voice Over

"Start dictation."

"Speech recognition on the Mac has been a long time coming. Few may remember this now, but the Mac had command-and-control speech recognition long before the PC did. I was at the debut—former Apple CEO John Sculley on stage with speech-recognition wunderkind Kai-Fu Lee—as the first command was given to Casper, as what would ultimately come to be known as PlainTalk was then code-named. It worked. And the audience went wild.

"Correct 'skull.' Cap S-c-u-l-l-e-y.

"Once PlainTalk arrived in the System Folder it was allowed to languish, never more than a cute trick you could use to entertain your friends. It wasn't until many years later that speech recognition in the Mac OS got a much-needed update. With OS 9, command-and-control in the OS finally got usable.

"And, of course, Apple didn't deliver the biggest innovation in recognition: dictation. Thanks largely to IBM's efforts, dictation now works, and works well, on the Macintosh. Yes, there is still some work left to perfect it, especially in terms of integration with other applications, but IBM's ViaVoice continuous speech recognition is an amazing step forward.

"Correct 'four words.' Pick 1.

"Want to know more about how to get speech recognition to really work on your Mac today? Check out our special report in this issue."

Speech Impediment

"The real shame is, as far as we have come, the Mac is still behind Windows in speech recognition, especially in getting it to work consistently in all applications. I don't blame this on the developers. I blame this on Apple. Apple could be doing a whole lot more to make it possible for companies to fully integrate speech software into the operating system. Users shouldn't have to build their own AppleScripts to get speech recognition to do basic things, like access menu commands.

"And there should be a standard way of connecting dictation to applications so that all features work in all applicable software. For example, we shouldn't have to give up direct correction of misinterpreted words just because we happen to be using an unsupported application.

"Correct 'mist interpreter.' Pick 2.

"And perhaps the best opportunity Apple has to fulfill the potential of this technology is just around the corner: Mac OS X. In the modern Mac OS, Apple could reinvent the user interface by making voice a standard way of interacting with the Mac. Not as an add-on, but as a fully and elegantly integrated input method.

"Too bad Apple seems concerned only with making the Mac OS X interface look pretty. The company could be doing for voice what it did for the mouse two decades ago, instead of agonizing over what shade of blueberry the buttons should be. With voice, you wouldn't even have to look at the screen to get work done.

"Transfer to Word.

"Computer, print document."

I'm sorry, Andy, but I can't do that.

"Computer, stick it where the sun don't shine."

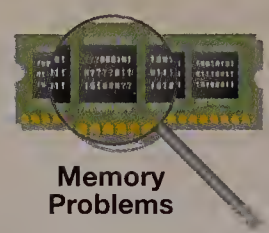
Sorry, Andy, I can't find that volume. m

Questions? Comments? E-mail them to Andy at visionthing@macworld.com.

ANTHONY RUSSO

The Seven Deadly Macintosh Sins:

Software Conflicts


Memory Problems

Viruses

Hardware Problems

Network Problems

Disk Damage

Damaged Software

Salvation:

When good Macs go bad and fall from grace, it's good to know there's help nearby. Salvation is only a mouse-click away with the new TechTool Pro 3. Now featuring virus protection and conflict detection, TechTool Pro is the only program you need to help abolish the evil forces that have possessed your Macintosh. TechTool Pro 3 checks more aspects of your Macintosh than any other utility available. Period. Besides repairing and recovering damaged drives, eradicating viruses and catching the occasional software conflict; you can also test all those other critical parts of your system that other utilities simply ignore. Like RAM, logic board components, floppy drives, scanners, modems, internet connections and so much more. TechTool Pro even supports technologies like System 9.0.1, "Pure" HFS+, Firewire and USB drives, and all of the latest Macintosh models.

TechTool Pro can also help you in between times of trouble. Our disk and directory optimize features can help improve the performance of your Macintosh as well as help circumvent problems before they happen. The TechTool Protection control panel will regularly check your system so you don't have to. It will also back up critical directory data, so if something goes wrong, you'll be up and running in no time flat.

But just because TechTool Pro is the most advanced Macintosh troubleshooting utility available doesn't mean that it has to be difficult to use. Our easy-to-use interface makes checking and fixing your Macintosh as easy as pressing one button. For advanced users, expert access allows you to control and configure TechTool Pro in almost any way you wish.

So if Macintosh troubles are turning your life into a living Hades, check out the tool of the trade: TechTool Pro. After all, you have the most powerful computer in the world. Shouldn't you be using the most powerful utility?

***Purchase TechTool Pro 2 now and receive a free upgrade to TechTool Pro 3 when it ships in Q1 2000!**

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News

online

Are Internet Devices in Apple's Future?

NEW PRODUCTS COULD EXTEND INTERNET PRESENCE

by Philip Michaels

JEFF NEUMANN

Mobile phones that let you send and receive e-mail; Web terminals in your kitchen that can download recipes; cars equipped with on-board computers able to locate restaurants, print out directions, and even help you phone ahead for reservations—devices such as these are either already on the market or at least in the planning stages. They're part of a growing universe of Internet appliances—basic consumer devices that offer easy access to the Internet. And, if one Wall Street analyst proves correct, Apple could soon join that universe.

Appliances Ahead? In a report issued after a February visit to Apple, Merrill Lynch computer analyst Steven Fortuna wrote that he expected Apple to unveil an Internet-appliance strategy this summer, possibly at Macworld Expo in July. Such an announcement would "add some meat" to the Internet strategy Apple announced earlier this year, wrote Fortuna in an earlier report.

Apple's reaction? "That would be speculation," spokeswoman Rhona Hamilton says, "and we wouldn't have a comment on it."

Analysts say Apple may be keeping mum about an Internet-appliance strategy in public. But that doesn't mean the company isn't mulling over such a plan behind closed doors. "They have no intention of getting out of the PC business. They're very firm about that," says Tim Bajarin, president of consulting firm Creative Strategies. But, he adds, "if you're Apple, you'd be crazy not to look at" developing the Mac OS for another company's Internet device or even producing an appliance.

Net Growth Consider the potential market. The number of Internet appliances should top 37 million in 2002, reports Jupiter Communications, an Internet-commerce research firm. That's a jump from 1.2 million in 1997.

Compaq, IBM, Hewlett-Packard, and Microsoft have either expressed interest in the Internet-appliance market or started rolling out stripped-down devices. But don't expect other companies to force Apple's hand. Devices such as Compaq's iPaq target the corporate market—not an area that Apple tries to woo, says Gerard, Klauer, Mattison & Company analyst Lou Mazzucchelli.

"Apple's always been a maverick," Creative Strategies' Bajarin says. "I don't expect them to march to [someone else's] drumbeat."

There are other reasons

continues

Apple might not pursue an Internet-appliance strategy. The company already has a successful consumer product—the iMac—that promises easy access to the Internet. An Apple-branded Internet device may harm iMac sales. And after putting its house in order with a series of successful product launches, Apple may want to avoid a Newton-like disaster, Bajarin says.

Still, Apple may decide that Internet appliances make perfect sense. While Internet devices won't ever replace PCs, their sales should skyrocket in the next few years. By 2005, Bajarin estimates, Internet appliances could outsell PCs by as much as a 4-to-1 ratio.

"Apple is the top brand in the world," Bajarin adds. "There's no reason to believe they can't make hay with an Internet device."

systems

A Friendlier Linux?

APPLE VETS BUILDING A CONSUMER VERSION OF POWERFUL OS

by Frith Breitzer

For the past few years, Linux proponents have trumpeted the merits of their grassroots, Unix-like operating system. It's free, it's fast, and because it enjoys broad support among programmers, bugs are easy to fix. But Linux's command-line interface may have put off many power users, keeping the operating system from gaining wider acceptance.

That could soon change. Former Apple employees Andy Hertzfeld, Michael Boich, Bud Tribble, and Susan Kare have teamed up at a new company called Eazel. Their goal? To build a new graphical shell, codenamed Nautilus, for Gnome 2.0 (a popular Linux desktop environment and application framework), and to offer Internet services that will help users install, configure, and update the operating system.

Apple Seeds Eazel's core management team has experience building an interface simple enough for anyone to use. Boich, the company's president and CEO, founded Apple's software-evangelism group for the Macintosh. Hertzfeld designed and implemented much of the original Mac system software, while Tribble managed the original Mac software team. Kare worked on the first icon designs for the Mac OS.

The question now: Can these Apple veterans do for Linux what they did for the Mac?

"The graphical shell is the glove through which the user touches the rest of the system," says Hertzfeld, who has kept the title "software wizard" from his days as a Mac programmer. "It really is a key point in terms of usability. But the toughest part is the system's care, feeding, and maintenance. The real opportunity here is to use the Internet to provide the knowledge base that can keep your computer running smoothly without any technological expertise on your part."

Programmers and developers make up the bulk of Linux users. About 89 million copies of operating systems were sold in 1999, research firm IDC says. Linux made up 4 percent (by comparison, the Mac OS accounted for 5 percent).

Source of Strength Eazel believes that the open-source nature of Linux is the OS's strength. With open-source software, developers are free to distribute and change code. Therefore, the software-development process becomes a collaboration, and no single company really owns the code.

A big focus at Eazel is developing custom interfaces for various file types. For example, the file manager might recognize a directory as being made up of music files and display it in a particular way. Users could then view the files in a mode that resembled an MP3 player, complete with song titles and running lengths.

Gnome 2.0—including Nautilus—will be free for people to change and distribute. Eazel plans to turn a profit by providing Internet-based services to Linux users. "Our overall goal is to make Linux and open-source software in general easier to use," Hertzfeld says.

For now, Gnome is aimed at current Linux users. In time, Eazel hopes it will appeal to novice computer users. A beta release of Nautilus is scheduled for this summer, and all the components of Gnome 2.0 should be ready for distribution by this fall.

publishing

Adobe Puts It All Together

ILLUSTRATOR, GOLIVE UPDATES OFFER MORE SHARED FEATURES

by Frith Breitzer

With Adobe's (800/833-6687, www.adobe.com) latest versions of Illustrator and GoLive, users will find that the company's applications have more in common than ever before.

Take the updated Web-authoring tool, GoLive 5.0. It includes Photoshop technology that allows users to automatically resize and optimize native Photoshop files within GoLive. What's more, GoLive, Illustrator 9.0, and the recently unveiled LiveMotion can share objects with one another. Clicking on an image in GoLive will automatically launch the Adobe application that created it. After you've edited the source file, it's automatically updated in GoLive.

Illustrator 9.0 shares features with other Adobe programs, including Photoshop. Users can export files to Photoshop with intact, editable type layers. Designers can use Photoshop and third-party filters on vector images, and the vectors remain editable.

Web Wonders The Illustrator upgrade includes

JEFF NEUMANN

Web-savvy features that users may recognize from other Adobe products. Illustrator 9.0 can export to Flash, GIF, JPEG, PNG, and SVG formats. Users of Adobe ImageReady will find that Illustrator 9.0 makes use of a Save For Web feature similar to the one in LiveMotion. This Web optimization tool allows users to see how changes in compression and optimization affect image quality.

GoLive 5.0 and Illustrator 9.0 add many other new features, including a few that designers have been requesting for some time.

For example, Illustrator 9.0 supports transparency. Designers can use effects including ghosted type, fades, and soft shadows. They can control feathering to soften transitions between foreground and background objects. In addition, users can turn any object into an opacity mask that controls how objects underneath it show through.

Common Code GoLive 5.0 includes new features such as a QuickTime editor for audio and video files that lets designers place QuickTime and Flash files on a timeline. GoLive is compatible with other forms of code, such as ASP, ColdFusion, and XML, because the program won't change code it hasn't created itself.

Taking a cue from Macromedia's highly extensible Dreamweaver HTML-editing program, GoLive 5.0 is extensible via a software development kit. GoLive 5.0 includes an integrated development environment for JavaScript that lets programmers customize features such as palettes, inspectors, and menu items.

GoLive 5.0 also supports the WebDAV standard, so designers can avoid overwriting each other's work.

Illustrator 9.0 is slated to ship during the second quarter of 2000. It will cost around $399, with upgrades priced at $149. CorelDraw and Macromedia FreeHand users can purchase Illustrator 9.0 for $249. Customers who bought Illustrator 8.0 after April 5, 2000, are eligible for a free upgrade. GoLive 5.0 is expected to ship in June 2000. At press time, Adobe hadn't set a price.

printing

Photo Printing Comes Home

PRINTERS MAY BE A BOON FOR DIGITAL CAMERA USERS

by Frith Breitzer

More-powerful cameras have brought the digital photo market into focus. Some recently introduced printers that cater to digital shutterbugs may push the digital photo business to the next level.

Photo printers have been available for years, but only recently have digital cameras been able to produce the high-resolution image files that make traditional photo-quality printing possible. And this time around, more-affordable photo printers could encourage more people to give digital cameras a try.

Epson (800/873-7766, www.epson.com) claims that its new Stylus Photo 870, Stylus Photo 1270, and Stylus Photo 875DC ink-jet printers can reproduce the look-and-feel of traditional silver-halide prints. Epson's printers feature a continuous edge-to-edge 4-by-6-inch snapshot printing system similar to those used in commercial photo labs. All three Epson printers feature 1,440-by-720-dpi resolution and new inks that the company says last longer than its earlier products.

The $299 Stylus Photo 870 and the $399 Stylus Photo 875DC were set to hit the market in early April 2000. The $499 Stylus Photo 1270 should ship in May. It has a wider, 13-inch carriage, making it compatible with more print sizes.

The Dye Is Cast Fujifilm (800/800-3854, www.fujifilm.com) has leveraged its experience with conventional film-based photofinishing to offer a different type of printer. The portable FinePix Printer NX-500 uses Fujifilm's Thermo-Autochrome dye-sublimation printing technology to produce 4-by-6-inch, 306-dpi prints in two minutes.

Unlike ink-jet printers, the FinePix requires no inks, toners, or ribbons. Instead, as in conventional photo printing, the dyes form in the paper. The FinePix should ship in May for $299.

Like Fujifilm, Sony (800/686-7669, www.sel.sony.com) uses a dye-sublimation printing process. Sony's UP-DP10 photo printer uses special paper to produce laminated 4-by-6-inch borderless photo prints with 300-dpi resolution. The printer was to ship in April, priced around $389.

systems

Windows 2000: Server with a Smile?

GIVES MAC USERS MORE THAN WINDOWS NT

by Philip Michaels

Mac users most likely took little notice of Microsoft's (425/882-8080, www.microsoft.com) splashy launch of Windows 2000. After all, the new operating system caters to the high-end computer-network market—not exactly the home turf of Apple's Mac OS.

Still, Mac users on networks run by Windows NT Server 4.0 may have reason to welcome Windows 2000. Microsoft promises that Windows 2000 Server will provide easier-to-manage file sharing and remote access for Mac users. Cross-platform networking specialists call the upgrade's Mac support a big improvement over what NT offers.

Corporate networks commonly include Macs, and Windows NT is often the server of choice. "There are probably just as many Macs connected to NT servers as there are connected to AppleShare," notes John Rizzo, editor of the cross-platform integration Web site MacWindows.com.

Windows Dressing? Still, NT Server 4.0 had a few problems supporting the

continues

Product WATCH

Print It Pretty Hewlett-Packard (800/552-8500, www.hp.com) has given graphics professionals more printers to choose from with its release of the **HP Color LaserJet 8550** printer series. The new printer line includes the **8550GN,** aimed at the graphics market. The 8550GN features 11-by-17-inch full-bleed printing, automatic Pantone color calibration, a 300MHz processor, and 128MB of RAM. Prices for the new printers start at $4,500, with the 8550GN retailing for around $8,500.

Bigger Is Better Continuing a quest for ever larger and ever flatter display screens, NEC (800/632-4636, www.nectech.com) has produced a 42-inch plasma display. The **PlasmaSync 42MP1** is designed for conference-room presentations, videoconferencing, and training programs. It's compatible with conventional video, HD video, computers, and DVI digital inputs and sells for $9,995.

The Note to End All Notes Weary researchers should be happy to hear that ISI ResearchSoft (800/554-3049, www.isiresearchsoft.com) has upgraded its bibliographic software. **EndNote 4.0** features a new user interface and more levels of customization. It also features autocompletion of new entries and automatic inclusion of entries in terms lists. The program retails for $299, though ISI ResearchSoft has special upgrade prices and student rates.—EDITED BY FRITH BREITZER

Mac. Early tests of Windows 2000 Server indicate that it corrects those flaws. For example, Windows 2000 supports Apple File Protocol over TCP/IP, whereas Windows NT allows Mac clients to share files only through AppleTalk. The addition of TCP/IP support via Windows 2000's MacFile feature makes it easier for Mac users to share files, Microsoft says. There's also the potential for faster data-transfer speeds with TCP/IP.

Another new feature, MacPrint, lets Mac users send documents to printers connected to a computer running Windows 2000 Server. Windows 2000 users can also send documents to printers on an AppleTalk network.

With Windows NT, Mac users couldn't dial in to the server and access the network remotely. Windows 2000 Server fixes that by letting Mac users dial in using the Mac OS's Remote Access control panel. The upgrade also fixes a bug in Windows NT that incorrectly reported the size and remaining space of volumes mounted on a Mac. Windows 2000 Server also offers consistent security for Mac and PC users across a network—a benefit for network managers, Rizzo says.

Even with those benefits, though, not every network administrator will rush to upgrade. Besides using more memory than Windows NT, the new operating system may have some glitches to overcome—as many as 63,000 bugs, according to an internal Microsoft memo. "Once that's shaken out, I do think Windows 2000 Server will benefit Mac users," Rizzo says.

Microsoft is selling Windows 2000 Server with ten-client access licenses for $1,199. The advanced version of the server sells for $3,999. Upgrades cost $599.

The Whole World in Your Hands

THINK OF THE QUARTZ COMPUTING PLATFORM AS A jack-of-all-trades for your handheld devices. After all, the newly unveiled Quartz design developed by Symbian (650/598-4747, www.symbian.com) can combine a PDA and a mobile phone to offer features such as e-mail, Web browsing, telephony, and wireless connectivity with other devices. The idea behind Quartz is to make it easier for handheld devices to communicate with each other. Motorola, a partner in the Symbian consortium, plans to release a Quartz-based phone in the first half of 2001. Symbian partners Ericsson and Psion have plans for Quartz as well. No word on whether Quartz devices will also do windows.—PHILIP MICHAELS

graphics

Pantone's More Colorful World

UPGRADES ADD COLORS, PAPER STOCKS

by Philip Michaels

Sixty-four colors may be enough for a box of crayons, but graphics professionals are a little more demanding. Enter color-standards provider Pantone (888/726-8663, www.pantone.com) with updates to its reference products that bring the total number of colors in its guides and chip books to 1,159.

"When you take a product that's 37 years old, you have to revamp and revise it based on the needs of the people who use it today," says Richard Herbert, Pantone executive vice president.

The upgrades add colors across the spectrum, as well as a more diverse palette of earth tones. Pantone says the new paper stocks are cleaner and brighter, and the company has added a matte-coated-paper edition.

The upgrades include revised color guides and chip books that show off the new colors and paper stocks. Pantone's $109 *Formula Guide* should be on shelves by this May, as should *Pantone Solid Chips*, a three-volume binder that will sell for $289. Also coming out this spring, the *Solid to Process Guide*, which compares Pantone colors to their closest matches in CMYK process color, will sell for $109, while *Solid to Process Chips* will sell for $229. Pantone's $129 *Process Guide* and two-volume $229 *Process Chips* are already available.

Pantone also plans to release two enhanced kits this May, the $219 Pantone Survival Kit and the $279 Ultimate Survival Kit.

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Reviews

PowerBook 2000

MILD-MANNERED UPDATE, OR SUPER-POWERBOOK?

ARNOLD TIOSEJO

A POWERBOOK IS MORE THAN A computer. It's a loyal companion, an indispensable assistant, a home entertainment system, and a gateway to the world. The mobility of the PowerBook, combined with an uncompromising feature set, makes it a fixture in the lives of mobile users. The only thing holding it back is a single wire leading from the back of the portable to a phone or Ethernet jack.

No more.

With the release of the latest PowerBook G3, Apple has added a host of improvements to a product that just a year ago *Macworld* deemed without peer. While the list of improvements is long and impressive, one new feature makes the release of the latest PowerBook a watershed event in the history of mobile computing: the addition of an internal AirPort slot. With a $99 AirPort card installed, the PowerBook cuts its last tie to the earth, leaving users free to roam their homes and offices.

A Featured Player

How can you one-up yourself when you already make the most feature-rich portable on the market? Simple: Pile on even more features.

All the features from the bronze PowerBook remain intact, including last year's industrial design (see *Reviews*, September 1999). But fear not: while the new PowerBook's chassis is unchanged, under that black polycarbonate skin is a totally new logic board that gives this portable more in common with Apple's supercomputing G4 desktop machines than last year's PowerBook.

Because the G4 is too power-hungry to make a good processor for a portable, the new PowerBook features a G3. But what a G3! The high-end configuration, still priced at a moderate $3,499, clocks in at 500MHz; the $2,499 model, at 400MHz. Better yet, Apple has surrounded these speedy G3s with state-of-the-art G4 logic boards. Highlights of the new board include the ATI Rage Mobility 128 graphics controller with 8MB of SDRAM and support for 2-D and 3-D graphics, the AGP 2× graphics architecture to push those pixels even faster, a 100MHz memory bus capable of supporting up to 512MB of PC100 RAM, and an Ultra ATA/66 hard drive with as much as 18GB of storage capacity.

Perhaps most incredible is what you get in the base model: a 400MHz G3 processor, 64MB of RAM, a 6GB hard drive, and a DVD-ROM drive. Yes, now all PowerBooks come standard with DVD-movie–playback capability, giving you the best seat in the theater on your next cross-country flight. The high-end model adds another 64MB of RAM; 6GB of disk storage; and of course, the 500MHz G3 processor. (A $3,997 system with an 18GB

REAL PRODUCTS REAL RATINGS — Reviews you can trust: Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
OUTSTANDING: ♦♦♦♦♦ VERY GOOD: ♦♦♦♦ GOOD: ♦♦♦ FLAWED: ♦♦ UNACCEPTABLE: ♦

drive, an extra battery, and an AC adapter is available only from the Apple Store.)

By the Numbers

Like cold, hard numbers to back up a product's claims? The results of Macworld Lab's testing should impress even the most-skeptical shoppers.

Using MacBench 5.0, we compared the 2000 PowerBook to both of last year's models and a 400MHz G4 desktop (see "More Power to Go"). We found that the new PowerBook's logic board delivered seriously improved disk and graphics performance, especially compared with its 1999 predecessor. For example, the 2000 PowerBook's graphics score is more than 60 percent higher than the 400MHz bronze PowerBook's. The 500MHz PowerBook delivered especially impressive graphics numbers, coming within shouting distance of the G4 desktop.

Our biggest surprise when testing the new PowerBooks wasn't speed results but battery life. You would expect battery life to go down as performance goes up. Not so with the new PowerBooks, which actually offer improved battery life. Using our office-software test and default energy-saver settings, we ran the 400MHz model for 3 hours and 26 minutes on one battery charge; last year's 400MHz model ran out of juice 25 minutes sooner. The 500MHz model delivered slightly less than three hours of battery life.

No Strings Attached

When you've got that extra battery life, what's the first thing you want to add to your portable? More power-hungry features, of course.

This PowerBook is the first to offer AirPort wireless networking, and we couldn't be happier. Until you've had the pleasure of showing someone a favorite Web site while cradling your PowerBook in one hand and running your other hand underneath it to demonstrate that there are no visible connections, you just can't appreciate how liberating wireless networking at Ethernet speeds can be.

While wireless technology offers the greatest impact for portable users, it's not the only important new capability in the 2000 PowerBook. This portable also adds two FireWire ports to the back panel, at last putting a stake through the heart of SCSI on the Mac platform. The PowerBook is the ideal home for FireWire—who better than mobile professionals to take advantage of tiny, light, hot-swappable hard drives that don't require separate power sources?

Then there's the matter of being able to directly download video from a FireWire-equipped DV camera to the PowerBook. Apple has foolishly left iMovie off the hard drive, expecting PowerBook users to pony up $999 for Final Cut Pro if they want to join the DV revolution. Sorry, Apple, but you clearly missed the boat on this one.

Bugs and Boos

It may take a while to learn all of the PowerBook's idiosyncrasies and figure out whether you can really live with them. For example, the first PowerBook G3 to include USB had several bugs associated with using that port, including losing USB devices. Those bugs, it turned out, were not fully addressed in the bronze PowerBook; Apple added to the list of petty annoyances DVD drives that would suddenly cease to function, and a tendency for the PowerBook to crash when waking up from sleep mode on a new network.

We're happy to report that with the new PowerBooks, the USB problems seem to have been resolved at last. So, too, have the mysterious problems with the DVD drives. However, after a couple of weeks of testing we noted that the sleep-crashing glitch began to rear its ugly head. As we went to press, Apple had posted a bug-fix that seemed to have eradicated the problem.

One other bug the new PowerBook seems to have inherited—not from earlier models but from the iBook—is date reset. Whenever you reset the system by pushing the button on the back panel, the computer zaps all parameter RAM, including date and time—which are reset to 1/1/1904, 12:01 a.m.

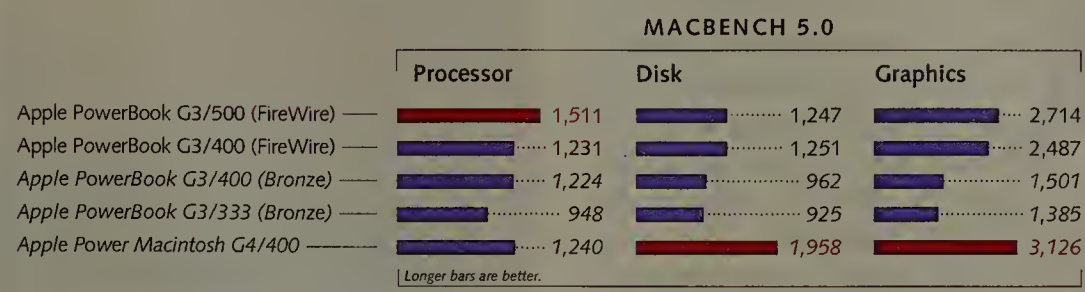
Macworld's Buying Advice

What can we say? Apple's done it again with the release of the new PowerBook. Yes, the company blew it by not bundling iMovie, but for most mobile professionals that won't matter much. And yes, the date-reset bug is unfortunate. Otherwise, this is as close to a perfect PowerBook as you can get. Now, for next year's model, let's talk about wireless communication for when you're away from an AirPort base station. . . .—ANDREW GORE

Macworld LAB TEST

More Power to Go

Best results in red. *Reference systems in italics.* MacBench 5.0 scores are relative to those of a first-generation Power Mac G3/300, which is assigned a score of 1,000 for each test.



Behind Our Tests We tested each system with Mac OS 9, a 2MB system disk cache, and virtual memory disabled. All machines were tested with 64MB of RAM, except the 500MHz PowerBook, which ships with 128MB of RAM.—**Macworld Lab testing supervised by Gil Loyola**

PowerBook G3/400

RATING: ♦♦♦♦½ **PROS:** Absolutely amazing feature set for the money; leaves very few reasons to step up to more-expensive configurations. **CONS:** No iMovie bundle makes DV features inaccessible; annoying date-reset bug. **COMPANY:** Apple Computer (800/795-1000, www.apple.com). **LIST PRICE:** $2,499.

PowerBook G3/500

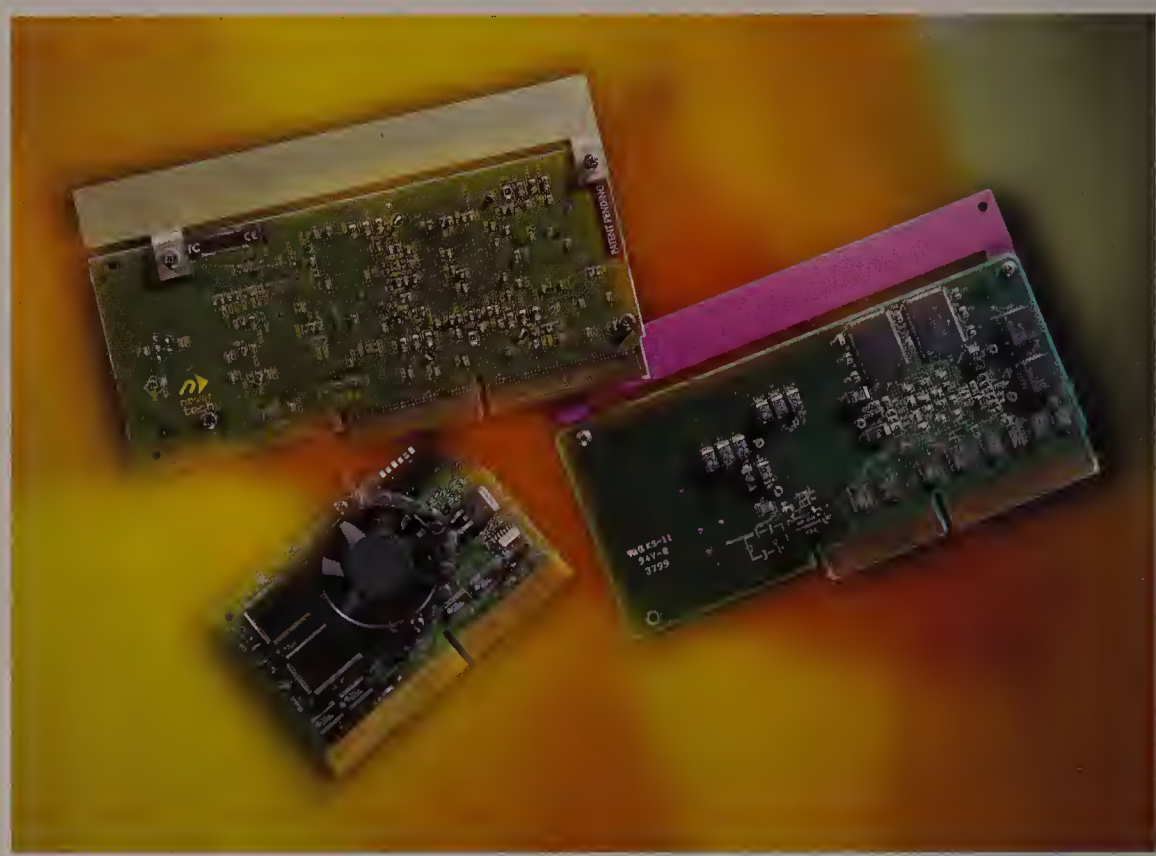
RATING: ♦♦♦♦½ **PROS:** Fastest Mac portable ever made; mind-blowing feature list. **CONS:** No iMovie bundle makes DV features inaccessible; annoying date-reset bug. **COMPANY:** Apple Computer (800/795-1000, www.apple.com). **LIST PRICE:** $3,499.

G4 Processor Slot Upgrades

SQUEEZE A FEW MORE YEARS OUT OF YOUR POWER MAC

APPLE DOESN'T SEEM TO LIKE beige. The public doesn't seem to like beige. *You* may not like beige. But if you have a beige Mac on your desktop, you might want to consider upgrading it rather than going graphite. The latest G4 upgrade cards are surprisingly stable and bring older Power Macs' performance close to that of new Macs. With prices ranging from $600 to $850, G4 upgrades aren't cheap, but many users—particularly those with a significant investment in peripherals—will find them an economical alternative to new 400MHz G4 systems, which start at $1,600.

Macworld Lab took a look at all the U.S.-made G4 processor slot upgrade cards, in both 350MHz and 400MHz configurations: Newer Technology's Maxpowr G4, Powerlogix's PowerForce G4, Sonnet Technologies' Crescendo G4 PCI, and XLR8's Mach Carrier G4. These upgrades work by



GIBSON

Clockwise from upper left: Newer Technology's Maxpowr G4, Sonnet Technologies' Crescendo G4 PCI, and Powerlogix's PowerForce G4.

G4 Upgrade Cards Compared

Company	Product	Mouse Rating	Company's Estimated Price	Contact	Pros	Cons
Newer Technology	Maxpowr G4 350MHz	4	$599	316/943-0222 www.newertech.com	Easiest card to install; on-board speculative-processing fix.	No DIP switches.
Powerlogix	PowerForce G4 350MHz	4	$599	877/849-2504 www.powerlogix.com	Includes fan; DIP switches let you select optimal bus and processor speed.	Documentation is only for the technically adept.
Sonnet Technologies	Crescendo G4 PCI 350MHz	4	$500	800/786-6260 www.sonnettech.com	Easy to install; excellent documentation.	No DIP switches.
XLR8	Mach Carrier G4 350MHz	3½	$719	888/957-8867 www.xlr8.com	ZIF card allows for future upgrades; DIP switches let you select optimal bus and processor speed.	Most expensive 350MHz upgrade at press time.
Newer Technology	Maxpowr G4 400MHz	4	$799	316/943-0222 www.newertech.com	Easy to install; on-board speculative-processing fix.	Expensive; no DIP switches.
Powerlogix	PowerForce G4 400MHz	3½	$850	877/849-2504 www.powerlogix.com	Includes fan; DIP switches let you select optimal bus and processor speed.	Most expensive at press time; documentation is only for the technically adept.
Sonnet Technologies	Crescendo G4 PCI 400MHz	4	$650	800/786-6260 www.sonnettech.com	Easy to install; excellent documentation.	Expensive; no DIP switches.
XLR8	Mach Carrier G4 400MHz	3½	$849	888/957-8867 www.xlr8.com	Upgrade comes on small carrier ZIF card for future ZIF upgrades; DIP switches let you select optimal bus and processor speed.	Expensive.

replacing the Mac's original CPU with a new one driven by a G4 processor. They're for use in the Power Macintosh 7300, 7500, 7600, 8500, 8600, 9500, and 9600; the DayStar Genesis and Millennium; the Power Computing PowerTower Pro and PowerWave; and the Umax J700 and S900.

Do You Need a G4?

The big difference between a G4 processor and a G3 processor is that the G4 uses AltiVec (called Velocity Engine by Apple). AltiVec offers a major speed boost, but only to applications that take advantage of it; multimedia and graphics software will see the biggest performance improvements.

In addition, not all software has been optimized to derive a performance benefit from the G4 processor (to see a list of software currently optimized for the G4, go to http://macworld.zdnet.com/2000/03/01/g4acceleratedtable.html). If the applications you commonly use aren't on that list, you may want to consider getting a G3 upgrade for your Mac instead; a G4 upgrade won't give you much of a boost.

All the G4 slot upgrades we tested delivered similar performance—not surprising, since they're all based on the same processor. What *is* remarkable about the upgrades is how close they come to matching the performance of new G4 machines. In most of our tests, each upgrade running in a Power Mac 7300 was nearly as fast as a graphite G4 with the same processor speed. Surprisingly, the only time the upgraded 7300 lagged noticeably behind was when we ran the Quake III tests—though, to be fair, the upgrades were running in a machine that previously would allow you to play Quake III only grudgingly.

Hardware Issues

All sophisticated computer processors use a technique called *speculative processing*—moving data they think they will need into the cache—to improve overall performance. The G4, since it usually runs four or more times as fast as the system bus, has a lot of time to speculate. (For more information on speculative processing and G4 upgrades, go to www.macworld.com/2000/06/reviews/g4upgradewoes.html.)

Getting a G4 upgrade to work in an older Mac means adding a bit of code to the Mac's open firmware (data stored on your Mac that controls some of its most basic functions) to prevent the new processor from making catastrophic mistakes while speculating. Newer Technology's upgrades have a ROM chip that contains this data; when the upgrade starts up, it puts the data into the Mac's open firmware. All the other upgrades take a software approach, requiring you to add the code to your Mac's open firmware from a floppy disk when you install the upgrade card.

The problem with the software approach is that you can accidentally delete the added code simply by zapping the PRAM. If this happens and your Mac refuses to start up, you need to remove the upgrade and reinstall the original processor, then run the open-firmware updater again, and finally reinstall the upgrade. If you think you'll remember to hang on to your old processor and the firmware floppy, then buy the least-expensive G4 upgrade you can find; if you're the belt-and-suspenders type and don't want the extra worry, you may want to go with a Newer Technology card.

Macworld's Buying Advice

This latest crop of upgrade cards offers terrific performance, nearly matching that of Apple's current systems. Newer Technology's solution to the speculative-processing issue is more robust, but all the cards are stable and perform well. The upgrade market is competitive, so be sure to check current prices before buying; prices drop often. No matter which card you choose, you'll enjoy the performance boost. You may suffer from graphite envy, but these upgrades make it cool to be beige.—DAVID READ

Macworld LAB TEST

G4 Slot Upgrades Add Muscle to Older Macs

Best results in red. *Reference systems in italics.* Photoshop results are in seconds. Bryce and SoundJam results are in minutes:seconds.

	PHOTOSHOP 5.5			BRYCE 4	SOUNDJAM	QUAKE III
	Gaussian Blur	Lighting Effects	Unsharp Mask	Render Scene	MP3 Encode	Frames/Sec.
Newer Technology Maxpowr G4 400MHz	8.2	6.0	13.9	23:40	2:49	24.6
Powerlogix PowerForce G4 400MHz	6.3	5.8	12.6	23:30	2:41	24.8
Sonnet Technologies Crescendo G4 PCI 400MHz	6.4	5.6	13.5	22:42	2:36	26.0
XLR8 Mach Carrier G4 400MHz	6.2	5.8	12.5	23:05	2:36	27.1
Newer Technology Maxpowr G4 350MHz	7.8	6.3	14.6	25:27	2:52	24.1
Powerlogix PowerForce G4 350MHz	6.7	6.5	13.1	26:15	3:00	23.6
Sonnet Technologies Crescendo G4 PCI 350MHz	6.9	6.3	14.0	25:50	2:54	24.6
XLR8 Mach Carrier G4 350MHz	6.8	6.4	13.6	26:08	2:55	25.8
Apple Power Macintosh G4/400	*6.1*	*5.2*	*6.8*	*22:25*	*2:24*	*31.3*
Apple Power Macintosh G4/350	*9.9*	*5.9*	*7.8*	*25:41*	*2:44*	*30.3*
Apple Power Macintosh 7300/200	*19.4*	*32.0*	*24.3*	*74:42*	*7:25*	*11.2*

Shorter bars are better. *Longer bars are better.*

Behind Our Tests

We tested each upgrade card in a Power Macintosh 7300/200 with Mac OS 9, 128MB of RAM, a 2MB system disk cache, virtual memory disabled, and an ATI Rage Orion graphics accelerator. We performed Photoshop tests with a 30MB file. We tested MP3 encoding with an audio-CD track that was 9 minutes and 25 seconds in length. We tested Quake III at a resolution of 640 by 480 pixels, with graphics set to Normal.—**Macworld Lab testing supervised by Gil Loyola**

iBook, iBook Special Edition

MORE POWER, SAME PRETTY FACE

THOSE OF YOU WHO HELD OFF purchasing an iBook until Apple resolved the original model's problems should get your wallets ready: beefed-up RAM and increased hard-disk space make Apple's latest portables more than just pretty faces. Both the iBook and the iBook Special Edition (SE) offer a more reasonable 64MB of RAM (expandable to 320MB)—double the skimpy 32MB that subjected the 1999 iBook to crashes and other problems (see *Reviews*, January 2000). And if you thought the original iBook's 3GB hard disk seemed cramped, you'll be pleased to know that the 2000 models offer twice the space.

The iBook still comes in a rugged, eye-popping tangerine or blueberry curved clamshell case, while the iBook SE sports a classy graphite and ice exterior and a boost in processor speed—from 300MHz to 366MHz. Apple is probably hoping the iBook SE will be as successful as the hot-selling iMac DV Special Edition. But unlike the iMac DV SE, which offers twice as much RAM and a larger hard drive than the iMac DV, the iBook SE offers only one technological advantage when compared with the iBook: a faster processor. This, and the graphite case, will cost you a cool $200 extra—the same as the difference between the iMac DV and the iMac DV SE. Still, the color alone may appeal to users who shied away from the Day-Glo tangerine and blueberry models.

New Books, Same Story

Macworld Lab tests confirm that the iBook SE's faster processor brings improved performance (see "An iBook by Any Other Name"). Users will find the speed increase negligible, however; whether surfing the Web or working in a word-processing application, you're not likely to notice a difference between the iBook and iBook SE. Fortunately, the changes to the iBook hardly compromise its battery life: the iBook SE's battery lasted about 4 hours, only 15 minutes less than that of the new iBook or the 1999 model.

GIBSON

Everything else about the new iBooks is the same—the 12.1-inch TFT display; 24× CD-ROM drive; 56-Kbps modem; 10/100BaseT Ethernet; and AirPort card slot, which lets you take advantage of wireless networking. And because AirPort 1.1 includes a working preview of AirPort Software Base Station (see the feature story "Cut Loose," elsewhere in this issue), you can now use any AirPort-equipped Mac as a base station.

As before, the iBook weighs in at 6.6 pounds—a bit heavy considering the PowerBook 2000 is only 6.1 pounds. And the Mac's Location Manager is still plagued by byzantine complexity, making it difficult for novice users to manage settings as they change locations.

We still wouldn't recommend the iBook as a gaming machine. Its ATI Rage Mobility graphics controller, 4MB of SDRAM, 66MHz bus speed, and relatively slow processor just can't keep up with demanding games.

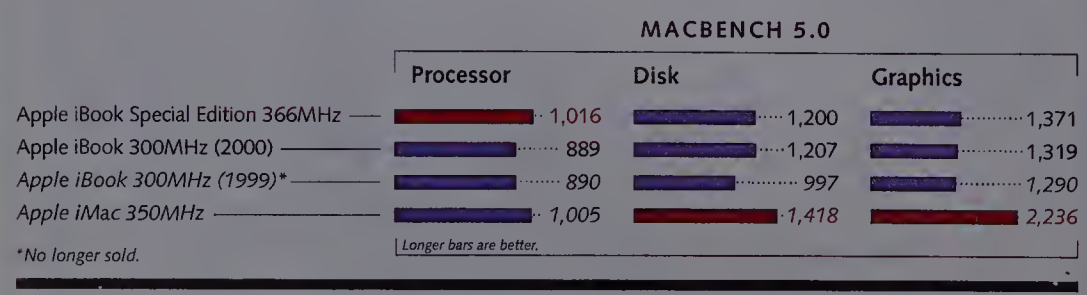
Macworld's Buying Advice

Budget-conscious buyers who need a portable computer—but don't need a lightning-fast processor, FireWire, an extra USB port, a PC Card slot, or VGA- and S-Video–out ports—will appreciate the iBook's value. And if the graphite case is worth $200 to you, by all means get the iBook SE. Road warriors who need more options and more power should consider the new PowerBook (see the PowerBook review elsewhere in this section) or an older-model PowerBook. But remember that for $100 less than the price of an iBook SE, you can get an iMac DV Special Edition with a 400MHz processor, 128MB of RAM, a 13GB hard drive, a DVD-ROM drive, FireWire, and iMovie video-editing software.—FRITH BREITZER

Macworld LAB TEST

An iBook by Any Other Name

Best results in red. *Reference systems in italics.* MacBench 5.0 scores are relative to those of a first-generation Power Mac G3/300, which is assigned a score of 1,000 for each test.



Behind Our Tests We tested each system with Mac OS 9, 64MB of RAM, a 2MB system disk cache, and virtual memory disabled.—**Macworld Lab testing supervised by Gil Loyola**

iBook

RATING: ♦♦♦½ **PROS:** Striking design; more RAM and hard-disk space. **CONS:** Limited configuration and expansion options. **COMPANY:** Apple Computer (800/795-1000, www.apple.com). **LIST PRICE:** $1,599.

iBook Special Edition

RATING: ♦♦♦ **PROS:** Elegant design; more RAM and hard-disk space. **CONS:** Extra money buys only marginal performance improvements. **COMPANY:** Apple Computer (800/795-1000, www.apple.com). **LIST PRICE:** $1,799.

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*February 1999 research by King, Brown, & Partners, an independent market research firm, showed that over 100 million web browsers have the Flash Player already installed. For details, please visit: www.macromedia.com/software/flash/survey/

Choose 36 at www.macworld.com/getinfo

Carrara

METACREATIONS' 3-D–MODELING DEBUT

AFTER CORNERING MUCH OF the low-end and midrange Macintosh 3-D–software market, MetaCreations has introduced Carrara 1.0, a completely new 3-D–modeling, –rendering, and –animation package. Designed to replace Ray Dream Designer and Infini-D, Carrara takes the strengths of those packages and adds a wealth of powerful features that will prove attractive to beginning and professional 3-D developers alike.

Five Rooms, Nice Previews

Like other MetaCreations products, Carrara sports a unique interface. It distributes 3-D–production tasks among five virtual "rooms": the Assemble room is for scene building and lighting placement; the Modeling room, for modeling; the Texture room, for texture mapping; the Storyboard room, for rough animation scripting; and the Render room, for creating final output. MetaCreations touts this "compartmental workflow" as a way of simplifying the creative process. Though the idea is interesting, the modal approach actually slows things down and makes some actions more difficult than they'd be in a document-centered program. And although the interface is beautiful to look at, I'd happily exchange it for larger windows and a more expansive workspace.

To its credit, Carrara provides excellent OpenGL support, with full interactive shading and lighting and good performance. Well-designed previews and swatches make it much easier to set up complex effects in Carrara than in higher-end programs such as autodessys's form-Z or Play's Electric Image.

Model Modules

Carrara offers a number of modeling environments. In the Assemble room, you can create and position simple primitives, including basic geometric shapes and infinite planes. There's a powerful Bryce-like terrain generator, as well as automatic fire, cloud, and fog generators.

When you're ready to model more-complex shapes, simply decide whether you want to create a spline, polygonal, text, or metaball object and drag the appropriate modeling primitive into your scene; Carrara places you in the appropriate modeling room and provides the necessary tools. Ground, *y*, and *z* planes make it easy to place objects. As you drag an object around the screen, shadowy outlines on each plane help you position objects accurately, and the Collision Detection option prevents objects from intersecting.

Multiple Modules Carrara's interface divides 3-D tasks among different rooms. Shown here is the Assemble room, where objects are placed and animated.

In addition to sweeping, extruding, lathing, and lofting tools, Carrara's powerful polygonal modeler provides vertex-level editing. The vertex editor, which lets you select and name groups of vertices, is one of the best I've seen. You can grab and manipulate vertices to easily "sculpt" your digital shapes. And Carrara's Sphere Of Attraction tool makes it simple to move a natural collection of vertices, preventing weird, pointy edits. You'll also find full Boolean controls and creasing and smoothing commands, although controls for beveling and rounding are conspicuously absent. Spline-modeling tools are quite powerful: in addition to extrusions, lathes, and skins, you can easily create twists, sweeps, and spirals and add cross sections to existing objects.

The Texture room is an excellent, full-featured texturing environment with complete multichannel shaders. With support for multilayered shaders as well as a hierarchical shader tree, Carrara's shading controls are impressive. Unfortunately, the drag-and-drop approach to applying shaders might make texturing difficult if you're working on complex models with many parts.

Animation and Rendering

Although the animation module is packed with powerful features, animation scripting is Carrara's weakest component. The program's timeline is easy to use and lets you animate any property of an object, but the program's tools can be frustrating to use. Unfortunately, its velocity controls—simple dialog boxes that present different keyframe-interpolation methods—are a far cry from the function-curve editors in more-powerful 3-D programs. And because Carrara doesn't automatically create motion paths between keyframes, refining an object's motion is difficult.

Multimedia and game designers will appreciate the program's powerful resolution controls for reducing the geometry of an object. Broadcast and film users, however, will be frustrated by the lack of support for the NTSC-standard 29.97-frame-per-second rate, motion blur, and field rendering.

Carrara's automatic-animation component is well designed and fun to play with, and the rendering engine is speedy. The hybrid ray tracer is the most impressive of several rendering options, providing ray-tracing quality at Phong shading speeds. Unfortunately, the program bogs down when presented with large polygon counts.

Macworld's Buying Advice

Carrara is an impressive achievement, especially given its version 1.0 status. If you're in the market for a well-rounded 3-D package, it's definitely worth a look. However, it's difficult to say if these good beginnings will ever bear fruit. MetaCreations has announced that it's selling off its graphics products but claims it will continue to develop them until a buyer is found. We hope the company will be true to its word.—BEN LONG

RATING: ♦♦♦♦ **PROS:** Very good modeling tools; powerful shading and effects; speedy renderer. **CONS:** Weak animation scripting; poor support for broadcast and film animators; bulky interface. **COMPANY:** MetaCreations (800/846-0111, www.metacreations.com). **LIST PRICE:** $399.

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Two-Megapixel Cameras

MODEST UPGRADES FROM KODAK AND OLYMPUS

KODAK AND OLYMPUS JUST might have the best track records for producing quality digital cameras. They release more models than any of their competitors, and their products frequently rank among the best on the market. The companies' latest two-megapixel offerings, the Kodak DC290 and the Olympus C-2020 Zoom, are well equipped with 3× optical zooms, rechargeable batteries, and synchronization sockets for external flashes.

But despite these strengths, neither camera will set the world on fire, each being no more than an incremental upgrade to a model released last year. The DC290 is the DC265 (♦♦♦♦; "Digital Cameras Develop," September 1999) with a higher-resolution CCD; the C-2020 Zoom is the C-2000 Zoom (♦♦♦♦; *Reviews*, October 1999) with the ability to record QuickTime movies. Further dimming their brilliance, the images these cameras produce can't match the quality of those produced by Nikon's Coolpix 950 (♦♦♦♦½; "Digital Cameras Develop," September 1999).

Everything Old Is New

The Olympus C-2020 looks awfully familiar—the CCD, the resolution, the optics, even the housing are the same as the C-2000's. The only noteworthy new feature is the camera's ability to record 15-frame-per-second, 320-by-240-pixel QuickTime movies. It's lots of fun, sure, but considering the camera's limited capacity—an 8MB card fills up after 15 seconds—and inability to record sound, it's more of a novelty than a genuine productivity feature.

The Kodak DC290 is the meatier upgrade, adding 700,000 pixels to the image sensor. But despite the box's claim of 3.3-megapixel resolution, the true resolution of the CCD is 2.3 million pixels—only about 9 percent higher than that of the C-2020 and the Coolpix 950. Like the C-2020, the DC290 captures splendid detail when an image is printed at high resolution, but the quality declines when you zoom in. By contrast, a typical image captured with the Coolpix 950 looks good no matter how close you get.

The DC290 ships with a 20MB memory card; can be connected to your Mac's USB port; and provides a terrific, user-friendly menu system. But you can't focus on objects any closer than a foot away, which for the purposes of macro photography might as well be a mile. And the DC290 is slow, taking about 8 seconds to process a picture, compared with 2 seconds for the C-2020. Finally, the LCD preview is choppy and dark, a problem common in Kodak cameras.

KIRK AMYX

The Olympus C-2020 Zoom (left) and Kodak DC290

The C-2020 would be a winner if it weren't for a couple of technical flaws. If you neglect to remove the lens cap before turning on the C-2020, the camera beeps at you and refuses to take pictures but doesn't tell you why. (Olympus should take a cue from the DC290, whose cap pops off automatically.) And unlike most cameras, the C-2020 fails to ask you to set the internal clock the first time you use it. Once you finally notice that your photographs are stamped with the wrong time and date, good luck figuring out the elaborate button sequence (18 clicks in all!) required to access the clock function.

Macworld's Buying Advice

The first three-megapixel cameras have already hit the shelves, and in the mad scramble that has ensued, who'll come out on top is anybody's guess. In the meantime, those who purchased the Nikon Coolpix 950 can rejoice. For nine months, this camera has maintained its spot as the best on the market. By comparison, the capable Kodak DC290 and Olympus C-2020 Zoom are merely runners-up.—DEKE McCLELLAND

Two-Megapixel Cameras

Company	Kodak	Olympus
Product	DC290	C-2020 Zoom
Mouse rating	♦♦♦½	♦♦♦
Company's estimated price	$899	$799
Contact	800/235-6325, www.kodak.com	800/347-4027, www.olympus.com
Dimensions (w × h × d, in inches)	4.6 × 4.2 × 2.5	4.3 × 2.9 × 2.6
Weight (with batteries, in ounces)	16	13
CCD resolution (in millions of pixels)	2.30	2.11
Maximum image size (in pixels) *	1,792 × 1,200	1,600 × 1,200
Default memory	20MB	8MB
Removable-media format	CompactFlash	SmartMedia
Storage capacity (in images) at maximum image size **	3–69	1–16
Closest focal distance (in inches)	12	8
Optical zoom function	yes (3×)	yes (3×)
Focal length (35mm-equivalent)	38mm–115mm	35mm–105mm
Built-in flash/external strobe hot sync	yes/yes	yes/yes
LCD preview/playback	yes/yes	yes/yes
Optical viewfinder	yes	yes
Rechargeable batteries with charger	yes	yes
Macintosh connectivity	serial, USB	serial

** Excluding interpolation. ** Varies according to compression.*

Mac-Disk Mounters

MACDRIVE, MACOPENER UPDATED FOR WINDOWS 2000

THE LATEST RELEASE OF MICROsoft's ubiquitous PC operating system, Windows 2000 Professional, doesn't support many common drivers and consumer-oriented applications. That's bad news for PC users, who will find themselves doing some serious software upgrading if they make the switch to the new OS. The good news for Windows 2000 users who interact with Mac users is that two packages for cross-platform file exchange have been updated, and you really can't go wrong with either one.

Apple of My Eye MacDrive 2000's handy red apple symbol lets you know when you're using Mac media on your PC. Otherwise, you'd think they were PC disks.

DataViz's MacOpener 2000 and Mediafour's MacDrive 2000 do what previous versions of these programs have always done: allow PCs running Windows 95, 98, NT 4.0, and 2000 Professional to handle Mac floppies, CDs, Zip disks, external drives, and pretty much any removable-media device connected via parallel, USB, FireWire, or SCSI port as if they were Windows media. With these programs, Mac files and disks become available on the Windows desktop and in Internet Explorer, as well as in PC programs' Open and Save dialog boxes, just like native PC files and disks. Both programs make sure that files transferred from one platform to another are represented by the correct icons—a QuarkXPress file transferred from Windows, for example, will have the XPress document icon when displayed in a Mac folder or on the desktop.

With MacDrive and MacOpener, you can also specify how Mac files are copied between Mac disks—in Mac-to-Mac mode or in Mac-to-NT mode—important if you use an NT server for Mac files. You can even format Mac media on your PC using these programs. (The Mac has had these capabilities for years, so it's easy to forget that your PC-using colleagues don't have the same ease of cross-platform sharing.)

Minor Differences

Like their predecessors, MacDrive 2000 and MacOpener 2000 are very similar products. But MacDrive offers a few additional features that higher-end users might like—for example, the ability to create a MacBinary file from any Mac disk (though not from PC disks, unfortunately) and to see information on Mac files' resources, such as creator and type. And MacDrive adds a red apple symbol to the folder window or disk icon so you know you're working with Mac media.

MacOpener 2000 offers the same basic features as version 4.0, the only real difference being Windows 2000 support. One nice (though not new) feature is the ability to control precisely when PC file-name extensions are added and deleted during Mac-to-Windows transfers. But MacOpener makes it difficult to add Mac file and creator types to its master extension-translation list (used to associate icons with files). MacDrive does a better job, letting you browse a file from a Mac disk and automatically detecting this information.

For most people, the features of these two competitors will be interchangeable. If you're upgrading, though, you'll find significant differences. DataViz charges $30, plus a $7 handling fee, for the MacOpener 2000 CD (with no option to download the application), whereas MacDrive 2000 is available for $20 per download (it's not available on CD). That makes MacOpener's upgrade price nearly twice the competition's, for what is simply a compatibility upgrade. And Mediafour bundles Aladdin's DropStuff and Expander with MacDrive 2000, making the program an even better value.

Do You Need It?

You may wonder whether you should even bother to upgrade, given that the previous versions of both programs worked with Windows NT 4.0 and Windows 98, and most NT 4.0– and 98-compatible programs work in Windows 2000. The answer is a decided yes, at least in MacDrive's case. Running the old MacDrive 98 will make Windows 2000 see ghost disks it can't properly install, causing crashes. Like NT, Windows 2000 handles such problems poorly—you may not be able to get Windows 2000 to run, even in Safe mode, when you go to delete the errant driver. The old MacOpener 4.0 is less dangerous: it won't cause Windows 2000 to crash, and with it you can even open Mac CDs (but not Mac Zip disks and some other Mac media).

Macworld's Buying Advice

Whether you choose MacOpener 2000 or MacDrive 2000, you'll get easy sharing of Mac media on your Windows 2000 PC. But we give the nod to MacDrive for its helpful apple identifier icon and significantly lower upgrade price.—GALEN GRUMAN

MacDrive 2000

RATING: ♦♦♦♦½ **PROS:** Seamless access to Mac disks in Windows 95, 98, NT 4.0, and 2000 Professional; icon identifies Mac disks. **CONS:** None significant. **COMPANY:** Mediafour (800/528-7440, www.mediafour.com). **COMPANY'S ESTIMATED PRICE:** $80; upgrade, $20.

MacOpener 2000

RATING: ♦♦♦♦ **PROS:** Seamless access to Mac disks in Windows 95, 98, NT 4.0, and 2000 Professional. **CONS:** Relatively steep upgrade price. **COMPANY:** DataViz (203/268-0030, www.dataviz.com). **COMPANY'S ESTIMATED PRICE:** $60; upgrade, $37.

Circle 57 on card or go to www.macworld.com/getinfo

Palm IIIc

COLOR HANDHELD BRIGHT BUT FLAWED

AFTER MICROSOFT ADDED SUPport for color screens to its handheld operating system, Windows CE, we expected Palm Computing to follow up quickly with a color device. Nearly a year after Microsoft's hardware licensees announced color handhelds, Palm has released the Palm IIIc, the first Palm device with an active-matrix color screen. But despite the impressive engineering of its screen and battery, the IIIc's performance flaws mar an otherwise promising device.

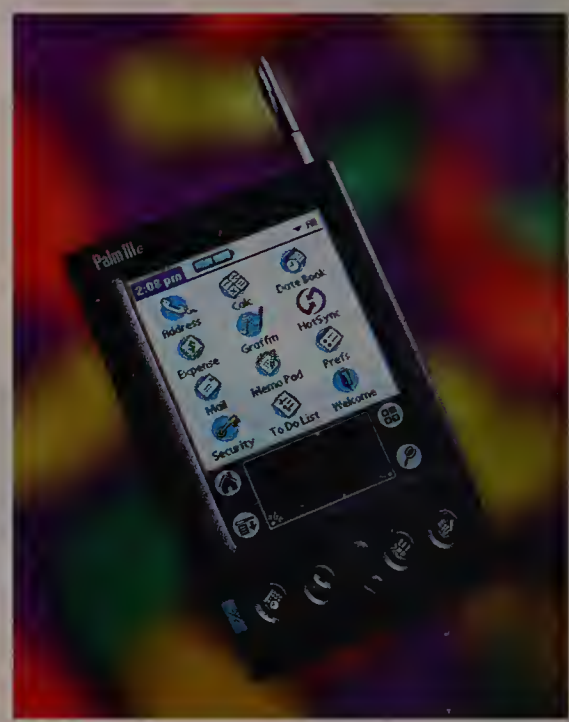
One reason the company has taken so long to introduce a color device is the extra energy a color screen requires. We found the Palm IIIc's battery life quite acceptable (Palm says the battery will yield approximately two weeks of normal use without a recharge). Like the Palm VX (♦♦♦♦; *Reviews*, June 1999), the Palm IIIc is equipped with 8MB of memory and powered by a built-in LiIon battery that charges while the unit is in its HotSync cradle. Frequent travelers will probably want to invest in the optional $40 recharger and leave the cradle at home.

The IIIc's centerpiece is its color screen, an active-matrix thin-film-transistor display that supports 256 bright, crisp colors. The luminescent white background makes it easier to read text and differentiate colors; an on-screen slider lets you adjust brightness for better visibility under varied lighting conditions and conserve battery life. Unfortunately, the reflective screen is difficult to read under fluorescent light and washes out in direct sunlight.

The biggest problem, however, is the built-in Palm OS applications' inability to support color as well as they could. Color can be an effective organizational tool; users should be able to color code categories for easy identification in the Address Book, Memo Pad, and To Do List. Displaying past-due tasks in red, for example, would make their status immediately apparent. All the Palm IIIc offers is a red bar indicating overlapping events.

Less problematic, but still annoying, is the Palm IIIc CD-ROM's omission of the Macintosh Palm Desktop software; you must either download the 6.8MB application from Palm's Web site or pay extra for a Macintosh CD-ROM. As a result, Mac users can't install the color-enabled applications included on the CD without using a Windows-emulation program, such as Connectix's Virtual PC. You can't even copy the program files from the CD's directory, because they're embedded in the Windows installer.

Palm has also announced the $249 Palm IIIxe, a very capable device whose only changes from earlier Palm III models are additional memory and the dark-



KEVIN CANDLAND

slate case color (like the IIIc's). The IIIxe lacks an internal open connector slot like the one found in the Palm IIIx, so you can't upgrade the IIIxe with additional memory or internal peripherals, such as pager cards, and its flimsy plastic stylus doesn't measure up to the metal-barreled one included with every other Palm III derivation.

Macworld's Buying Advice

If you need a color Palm device to view pictures, play games, or boast the latest technology on the block, you'll love the Palm IIIc. Its smartly designed hardware points to a brighter future for all Palm devices. But the software's lack of color support will disappoint those looking to get organized, and $449 is a bit pricey considering that, at the moment, the color screen only adds eye candy.—JEFF CARLSON

RATING: ♦♦♦½ **PROS:** Bright, crisp color screen; acceptable battery life; rechargeable battery. **CONS:** Poor color implementation in software; continued Mac neglect. **COMPANY:** Palm Computing (800/881-7256, www.palm.com). **LIST PRICE:** $449.

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S10

2.1 Megapixels

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4th Dimension Standard Edition 6.5

HIGH-END DATABASE GETS WEB-SAVVY

BACK WHEN 24MHZ DENOTED a wicked-fast machine, ACI US's 4th Dimension (4D) was the first high-end relational-database application for the Macintosh. Today's entry-level Macs have enough horsepower to use 4D to run the IRS; however, the database challenge these days isn't providing sheer size and speed but finding the fastest way to publish data on the Web. ACI US has produced a thorough, simple Web implementation in 4D Standard Edition 6.5.3. The update retains the original's clean design—setting up tables and defining relationships between them is still quick and easy—but now your efforts also yield a commercial-grade Web site, complete with logs and site statistics. And the Windows and Macintosh versions of 4D 6.5 are nearly identical, so you can develop on one type of machine and deploy on the other if necessary.

Web-Ready Despite idiosyncrasies such as fixed-size windows, 4D Standard Edition 6.5.3 can be modified for immediate use on your Web site.

After a few years of receiving emergency Internet fixes, 4D has grown into an integrated database-development environment for Web applications. New features include a wizard that walks you through Web publication of your relational database with just a few simple choices. Remarkably, the resulting databases (accessed through 4D Server, which is now integrated into 4D Standard Edition) are faster than almost anything else you'll encounter on the Web. 4D old-timers will revel in the broad e-mail–format support and the programming tricks possible with 75 new Internet action commands; newcomers will likely be content to let the wizard generate dynamic HTML pages on the fly and to establish a site by following simple instructions. A simple mail-order catalog, for example, should take you only a few hours to shape up for the Web, making 4D a reasonable alternative to a consultant for developing a custom site.

ACI US claims to have improved database indexing in 4D 6.5 by using a new algorithm, but it's hard to evaluate the speed increase numerically. We tested 4D 6.5 on a machine with four times the throughput of the Mac used to test version 5. With a 10,000-record database, there's no perceptible indexing delay for normal operations.

Version 6.5 also includes an upgrade of 4D Write, essentially a hybrid between a word-processing and a page-layout program. The $799 Developer's Edition includes a compiler, a module for incorporating external code, 4D Draw, and utilities for backup and code management.

4D sports some features that you'll find either charming or annoying. Poke around in the HTML examples, for instance, and you'll encounter lots of untranslated French—a tribute to 4D's Gallic heritage. A bigger problem is that 4D operations slow down if you're running other standard software (such as Microsoft Word) at the same time.

If you've used 4D before, the upgrade decision is an easy one. If you went the 4D route as a beginner, 4D 6.5.3 gives you a simple but flexible way to build a commercial Web site. But in doing so you'll be turning away from the standard repertoire of Unix-derived methods (CGI, Perl, and others) used by nearly all other Web developers.

Macworld's Buying Advice

4th Dimension Standard Edition 6.5.3 is a complete, self-contained tool for developing a database, and it's probably the fastest way to put a catalog and order forms on the Web—as long as you don't mind doing things the 4D way.—CHARLES SEITER

RATING: ♦♦♦♦½ **PROS:** Simple relational-database design; automatic conversion to Web-viewable format. **CONS:** Occasionally bogs down. **COMPANY:** ACI US (800/881-3466, www.acius.com). **LIST PRICE:** $349.

Alpha Centauri

A NEW VISION OF THE FUTURE

SID MEIER, THE MAN WHO came up with a PC gaming institution called Civilization, has managed to reinvent the strategy-game genre once again. Sid Meier's Alpha Centauri, published by Aspyr Media, begins where Civilization left off: your colonists, last seen blasting off into space toward the nearest star, are now building a new civilization on a planet orbiting the star Alpha Centauri. While this sequel superficially resembles Civilization, it incorporates such sweeping changes to its predecessor's civilization-building model that it feels like a completely new game.

Alien Frontier Sid Meier's Alpha Centauri has an intentionally dark feel to suggest an uncertain future.

Alpha Centauri presents a complex view of the future. The colonists, while en route to their new home, separated into seven factions based not on nationality but on ideology. The faction leaders would like to see the new planet developed along their own ideological lines; as a player, you assume the role of one of these leaders and work to develop the virgin planet to your satisfaction, all the while attempting to buy, cajole, force, or even beat cooperation from your neighbors as you compete with them for the planet's precious resources.

The game allows you to select government and economy types based on those in the world today, along with a few suggested in literature. You might have a free-market democracy, or you could have a centrally planned police state. Dozens of distinct paradigms for organizing your people to face the threats of life on an alien world are possible.

Alpha Centauri has far more technologies and wonders waiting for discovery

than the Civilization series offers. Many of these technologies come from science fiction, but others derive from contemporary philosophy or the most advanced speculations of modern science. As developments like self-aware machines and superstring theory become available to your faction, quotes from Nietzsche and Kierkegaard suggest ways to weave new discoveries into the social fabric.

As in Civilization, you can produce both combat and noncombat units to perform basic tasks for your faction. However, Alpha Centauri's method for pricing and creating units is very different. In Civilization, when you develop a new technology, a new unit becomes available at a fixed cost. In Alpha Centauri, you create units using all available technologies—no single technology produces a totally new unit.

Alpha Centauri is a full multimedia experience, with movies that play upon completion of secret projects, aural feedback (the game talks to you), and user interfaces designed to move and beep for your entertainment. All these features will slow down older Macs, but you can turn off most of the multimedia whiz and bang for quicker play.

You control the action with an easy-to-use on-screen console—quite a feat, considering the complexity of the rules and the number of features under your control. While not perfect and in no way Mac-like, the pop-up menu controls in the console window allow you to handle loads of data and options efficiently. Additionally, you rarely need to leave the convenient console and go to any other menus in order to play.

Macworld's Buying Advice

Alpha Centauri gives armchair diplomats the opportunity to manage a society, with all the corresponding decisions about government, economics, ecology, and scientific research. It's also an extremely complex game; fortunately, it includes excellent reference material both in print and online, as well as tutorials. Alpha Centauri is the best take to date on the Civilization-style game.—DAVID READ

RATING: ♦♦♦♦½ **PROS:** Engrossing sci-fi plot; addictive game play; sophisticated social modeling. **CONS:** Level of detail may be overwhelming; rich multimedia features can tax older Macs. **COMPANY:** Aspyr Media (888/212-7797, www.aspyr.com). **LIST PRICE:** $50.

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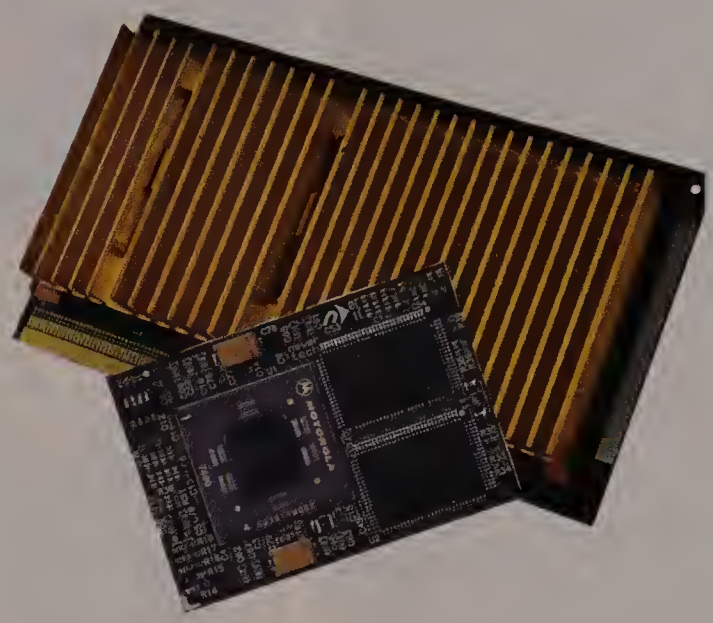

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Perfection 1200U Photo

EPSON'S NEW SCANNER AIMS TOO HIGH

TARGETED AT THE SMALL- AND general-business markets, as well as at photo enthusiasts and graphic artists, the Perfection 1200U Photo is Epson's top-of-the-line entry-level photo scanner. If you want a scanner simply to capture images for the Web or presentations or to do basic OCR and document scanning, the Perfection can do the job. But if you're a graphic artist or photo enthusiast who cares about fine nuances of tone and color and wants to use professional image-editing software like Adobe Photoshop, you'd do better with a scanner that offers high-bit output and allows you to scan directly into one of Photoshop's RGB working spaces.

The Perfection 1200U Photo has a USB interface, boasts a transparency adapter, and scans letter-size reflective originals or film as large as 4 by 5 inches at resolutions as high as 1,200 by 2,400 pixels per inch. It's quite speedy: a prescan takes about 8 seconds, and a 4-by-6-inch print scanned at 600 dpi takes about 38 seconds. The autoexposure feature does a decent job of setting highlight and shadow points and removing obvious color casts.

However, the transparency adapter promises more than it delivers; the Perfection's resolution just isn't high enough for 35mm film. Epson recommends scanning 35mm originals at 2,400 dpi, which in theory would give you a file from which you could

KIRK AMYX

produce 8-by-10-inch prints on an ink-jet photo printer. But when we did so, we found obvious aliasing along the edges. The Perfection creates decent 1,200-dpi scans from film, which will let you make good 5-by-7-inch ink-jet prints, but the results of further enlargement are disappointing.

Worse, the Perfection's TWAIN driver supports ColorSync, but only for scanning into 24-bit monitor RGB. And although the scanner captures 36 bits internally, there's no way to capture high-bit data to disk. Worst of all, Epson uses arbitrary numbers for its shadow, highlight, and gamma settings: gamma values range from 50 to 500, highlight values from 61 to 490, and shadow values from 0 to 60.

Aside from the driver, the Perfection's software bundle includes Adobe's entry-level image editor, PhotoDeluxe 2.0; NewSoft's Presto PageManager for Epson, which offers document cataloging and basic OCR; and Brøderbund Software's The Print Shop PressWriter, for producing calendars, greeting cards, and the like.

Macworld's Buying Advice If you want fast, automatic scans free of gross flaws, the Perfection 1200U Photo delivers—though if you don't need the transparency adapter, you can get by with the less expensive Perfection 1200U. But if you want an entry-level scanner that offers serious digital imaging, look elsewhere.—BRUCE FRASER

RATING: ♦♦♦ **PROS:** Good image quality from prints and film; easy automatic scanning. **CONS:** Idiosyncratic advanced controls; obvious aliasing on 2,400-dpi scans. **COMPANY:** Epson America (800/463-7766, www.epson.com). **COMPANY'S ESTIMATED PRICE:** $399.

Mixman Studio Mac

REAL-TIME SAMPLE MIXER

A VISIT TO AN URBAN DANCE club proves that creating a booty-shakin' groove no longer means gathering a group of musicians in a darkened recording studio. Much of the music that thumps through these establishments is created by blending digitally recorded snippets of sound—or samples—into a musical whole. Mixman brings the club experience of live sampling to the Mac with Mixman Studio Mac 1.1, a program that is fun to play with but would benefit from the addition of features found in its PC counterpart, Mixman Studio Pro 3.0.

Mixman comprises two main elements—the Remixing Studio and the Recording Studio. You'll spend most of your time in the former; the latter is simply for recording AIFF sound files on your Mac. (Mixman offers no tools for editing the sounds you record.) The Remixing Studio has a unique interface, consisting of two turntables that let you assign as many as 16 sound samples, and a tape-transport control that you use to start and stop playback, record performances, and save and open mixes. Each turntable sports eight slots where you assign sounds—*tracks*, in Mixman lingo.

To assign a track to a slot, double-click on the X that marks the slot, and then pick from among the provided tracks or select any AIFF file. You can preview sounds and—for Mixman tracks only, not AIFF files—shift the track's pitch and scale its tempo to match the rest of the mix. The included tracks feature percussion, brass, keyboard, vocals, guitar, and other instrument types. They sound great and come in a variety of styles, including Techno, Reggae, House, Latin, Sixties, and Hip Hop.

To play a mix, you click on the Play button and hold down the keys on your Mac's keyboard that trigger individual sounds. To "lock" sounds so they continue to play, you press the key that corresponds to the sound you want—the C key for a kick-drum pattern, for example—along with the space bar. To record your mix, click on the Record and Play buttons, then start tapping on your Mac's keyboard.

Although the interface looks great, it's limiting. By eschewing a timeline (the PC version sports a timeline editor), Mixman makes it difficult to create arrangements. If you want to lay down specific numbers of measures in your mix, you'll spend a lot of time counting beats and pushing keys. Dragging and dropping riffs into a timeline

Tracks on Wax You can play and mix as many as 16 sampled tracks with Mixman Studio Mac 1.1.

would be much easier. A mixer window that lets you easily see and adjust pan and volume levels would also be welcome, as would the ability to assign new tracks as a mix plays.

Macworld's Buying Advice Mixman Studio Mac 1.1 is a fun and useful musical tool—and will be even more fun and useful when its features match those of the PC version.—CHRISTOPHER BREEN

RATING: ♦♦♦½ **PROS:** Sounds great; easy to use. **CONS:** No timeline; limited mixing capabilities. **COMPANY:** Mixman (415/403-1380, www.mixman.com). **LIST PRICE:** $80.

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Quake III Arena

FAMILIAR FUN, NO SURPRISES

BY NOW, ACTION GAMES IN which you careen through hallways blasting the bejeezus out of anything that moves are familiar enough that Mac players are in danger of finding the whole proposition a bore. The folks at id Software—creators of legendary action titles such as Wolfenstein 3-D and the Doom and Quake series—undoubtedly hope their latest release, Quake III Arena (distributed for the Mac by Activision), will provide enough heart-pumping action, glorious graphics, and compelling level design to mask the fact that the game is mostly more of the same old thing.

Those who live for Deathmatch play, however, are likely to welcome this same old thing. In the latest iteration of Quake, id has produced some great Deathmatch maps complete with rounded surfaces, dramatic lighting, fog, and—replacing the elevators of old—jump pads that propel you from level to level. However, the game lacks extensive cooperative play. Although Quake III includes the team game Capture the Flag (with a scant four maps), it doesn't offer the innovative team play found in Unreal Tournament's (♦♦♦♦½; *Reviews*, May 2000) Domination and Assault games.

Quaking in Your Boots Quake III Arena's expansive environments provide plenty of space for movement and mayhem.

As with Unreal Tournament, Quake III's single-player game is really a series of training missions where you face computer-controlled "bots." Going head to head with these critters, you can make your way through the game's 26 maps before challenging flesh-and-blood opponents on a LAN or the Internet. Single-player Quake III also gives you an opportunity to brush up on your skills. Bots are designed to emulate human players, dashing and leaping about in unpredictable ways. The degree to which they imitate their human counterparts depends on the skill level you choose. Only the newest players will find the first two levels challenging, while the fifth level, Nightmare, features inhumanly skilled bots—they *never* miss.

When playing against the computer, you can choose either Skirmish mode—where you can select any map, populate it with opponents, and determine the "frag" (kill) or time limit necessary to win the skirmish—or Tournament mode, in which you fight your way through a series of maps to reach the seventh tier, where you face Xaero, the ultimate bot.

id has done a nice job of making the game playable over the Internet, even with a dial-up connection. Via a 56-Kbps connection, we experienced only occasional lags even with most of the game's graphic goodies switched on.

Macworld's Buying Advice Quake III Arena breaks no new ground, but it's a great-looking game that offers terrific Deathmatch play against both bots and human adversaries. And isn't that what Quake is all about?—CHRISTOPHER BREEN

RATING: ♦♦♦♦ **PROS:** Great graphics; responsive Internet play. **CONS:** Limited cooperative play. **COMPANY:** Activision (310/255-2000, www.activision.com). **LIST PRICE:** $50.

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ArtMatic 1.2

PSYCHEDELIC ART SYNTHESIZER

HIGH-SCHOOL TRIGONOMETRY students might take an opposing view, but mathematics *can* be beautiful. While only the most mathematically adept may grasp this notion when dealing with raw numbers, U&I Software's ArtMatic 1.2 clearly demonstrates the concept. This graphics application uses mathematics to let you create vibrant, psychedelic images with almost no effort.

ArtMatic generates its art by feeding fractal images through a series of mathematical functions called *components*. The program includes 20 collections of components, called *structures*, which operate like a synthesizer's filters—the data undergoes a transformation as it proceeds through a structure.

Electric Banana With the click of a die, ArtMatic 1.2 generates images like this one effortlessly.

Frighteningly confusing as this underlying architecture sounds, ArtMatic is very easy to use and a lot of fun to play with. Just launch the program, select a structure, and click on a large die to randomize the parameters within the selected structure; ArtMatic generates an image. The parameters range from the intuitive (Skew, Circles) to the arcane, and each component has its own set. You can tweak the image by zooming in and out, selecting a new parameter from one of the components, or clicking on a smaller die to mutate the parameters slightly or randomize the picture's color values. You can also move sliders to manipulate the parameters of the currently selected component. Use the controls at the bottom of the ArtMatic window to adjust the image's hue and contrast, as well as animate it. You can save animations as QuickTime movies.

The results of your explorations can be breathtakingly beautiful, evoking exquisitely textured stained-glass windows, haunting insectoid images, and burbling fluid forms reminiscent of '60s light shows. However, because the program generates these images randomly, they can be intensely ugly or just plain dull as well. More often than not, though, you'll generate something interesting. Those seeking intriguing patterns—for backgrounds, clothing, or MetaCreations Bryce landscapes, for example—might gain inspiration from ArtMatic's output.

ArtMatic demands a fair amount of processing power—for smooth animation, you need at least a G3 processor. This need for speed may also explain why ArtMatic can't manipulate images in real time—you can't alter parameters while animations play. Unfortunately, that means you have to stop playback to zoom in and out or adjust colors. Also, the program can't render antialiased animations on the fly; you must export files as QuickTime movies for fluid animation.

Macworld's Buying Advice Artists and nonartists alike—at least, those with fast Macs—will enjoy working and playing with ArtMatic 1.2. It's easy and fun to use, generates wondrously engaging images, and offers you the opportunity to zone out with your Mac.—CHRISTOPHER BREEN

RATING: ♦♦♦♦ **PROS:** Easy to use; produces intriguing images. **CONS:** Can't alter images during animation playback. **COMPANY:** U&I Software (650/367-6161, www.uisoftware.com). **LIST PRICE:** Download, $79; CD-ROM, $99.

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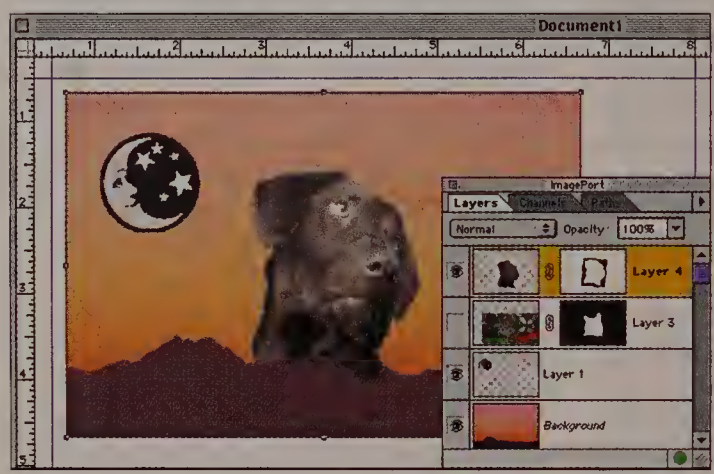
ImagePort

GET PHOTOSHOP IMAGES INTO XPRESS

AFTER TEN YEARS OF HEARING people ask why they can't import an Adobe Photoshop file directly into a QuarkXPress picture box, I developed a stock answer: "Because you have to save the image as a TIFF, EPS, JPEG, or DCS file first." Fortunately, the folks at a lowly apprentice production have apparently heard the same complaints, because they've developed a Quark XTension that not only lets you import native Photoshop files into QuarkXPress picture boxes, but also lets you manipulate layers, channels, and paths from within XPress. ImagePort 1.0 isn't perfect—it can't handle some Photoshop files—but many users will find it an invaluable productivity tool.

Let me be clear: ImagePort provides no tools for drawing or editing pixels (you still have to use Photoshop for that). However, in addition to letting you import layered Photoshop files and hide and show layers, layer masks, and channels, ImagePort really shines in its control over spot-color channels. To modify the color of spot-color text in a Photoshop image, you just make the change in XPress's Color palette; ImagePort updates the screen preview to display the new color. To build a varnish plate in the shape of your image, you create a channel in Photoshop and then tell ImagePort to separate it as a varnish "color." (ImagePort can also import and separate indexed-color images.) Printing is equally easy, though your service bureau will need the free Print-Only ImagePort XTension (which ships with the product and is also available online) to print your document properly.



A Little Taste of Photoshop The ImagePort 1.0 palette lets you hide and show layers within a native Photoshop image.

Like most newly released software, ImagePort is missing several important features. For instance, it can't currently read images in Duotone mode; it can't even read Photoshop's adjustment layers or effect layers. (You have to render these effects to a layer or flatten the image before importing it.) Nor will the program let you convert clipping paths to XPress boxes, apply spot colors to paths, or merge QuarkXPress objects into your images.

Macworld's Buying Advice ImagePort 1.0 isn't for everyone. Many production workflows still require that you use TIFF and EPS files, and many people will find dealing with bulky, layered Photoshop files more painful than working with nice, small, flattened JPEG images. But after years of using a particular workflow, you just might find that the ImagePort XTension breathes new life into your QuarkXPress documents.—DAVID BLATNER

RATING: ♦♦♦♦ **PROS:** Program lets you open and print layered Photoshop files in QuarkXPress, assign spot-color channels, and hide or display layers. **CONS:** Doesn't work with all Photoshop files. **COMPANY:** a lowly apprentice production (888/818-5790, www.alap.com). **LIST PRICE:** $100.

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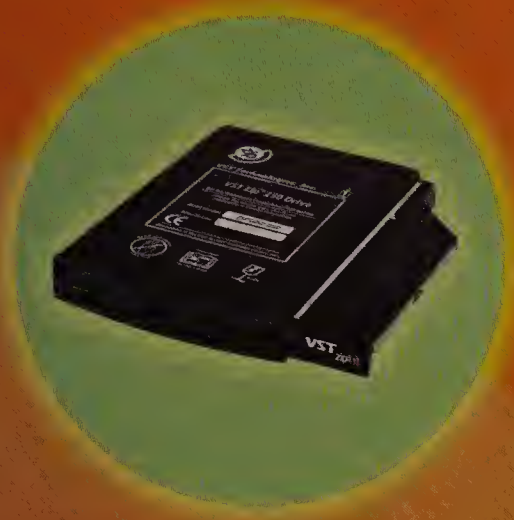

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Chessmaster 6000

REVIVED KING OF MAC CHESS GAMES

EVEN AFTER LANGUISHING FOR five years, Chessmaster still reigns as king of the Mac chess world. The recently released Chessmaster 6000, from Mattel Interactive, isn't quite worth the wait, but it does deliver a compelling way to learn the game and sharpen your skills. Just don't ask for more than that.

Rank beginners can start with the program's tutorials, written by renowned teacher Bruce Pandolfini. The tutorials teach opening concepts, endgame principles, and tactics using a question-and-answer format, fully explaining correct and incorrect answers. Players at all levels will appreciate the voice annotations from International Master Joshua Waitzkin, the subject of the movie *Searching for Bobby Fischer.* As Waitzkin talks you through some of his favorite games, Chessmaster 6000 uses lines and colors to highlight relevant pieces, maneuvers, and squares. Waitzkin's contributions are a treasure—he tells you not only what's happening on the board, but also what was going on in his head while he played the game.

Hear It, See It Chessmaster 6000's board highlighting helps illustrate its voice annotations.

That's all well and good for beginners, but what about experienced wood pushers? Chessmaster 6000's powerful engine makes it a formidable opponent. However, trying to pry into that mind to gain some insight is a frustrating exercise. The Thinking window, which displays the moves Chessmaster 6000 is calculating, is of little help because the program uses a format that humans have trouble following: it records each move using source and destination squares, without move numbers or piece designations. You can opt to see natural-language annotations instead, but they're often useless or garbled.

Chessmaster 6000 introduces rated play, a fun but flawed concept. Play a few games against the software's computer personalities and earn your own performance rating, as in real tournament chess. It's a good idea and a nice break from the all-seeing Chessmaster, but it doesn't quite work on a practical level. The fault lies with the artificial-intelligence personalities. Almost all the weaker personalities play erratically—they lose vital central pawns in the opening; find master-level tactics in the middle of the game; and as if suddenly remembering they're supposed to be weak players, give away pieces in the endgame.

Unfortunately, if you're tired of getting waxed by the Chessmaster or playing the artificial-intelligence opponents, there's no way to play with another human unless the two of you are sitting at the same keyboard. The Windows version now supports Internet play, so there's hope for Mac users.

Macworld's Buying Advice If you're looking for a fun way to learn the game or for a tough sparring partner, Chessmaster 6000 is a wonderful tool. If you want heavy analysis of moves and strategies, you won't find it here.—MARTY CORTINAS

RATING: ♟♟♟½ **PROS:** Strong play; solid teaching features. **CONS:** Extracting useful analysis is frustrating; no Internet play. **COMPANY:** Mattel Interactive (800/779-6000, www.mindscape.com). **LIST PRICE:** $40.

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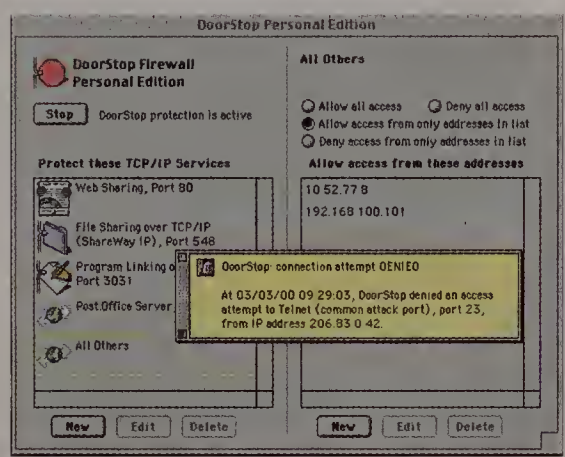
DoorStop Personal

INDIVIDUAL INTERNET PROTECTION

THE SURGE IN DSL AND CABLE-modem Internet connectivity brings a new security problem for individual users: home Internet invasions. Because these technologies connect your computer to the Internet around the clock, the probability of a hacker discovering and attacking your little Net outpost greatly increases. The solution to this problem is firewall protection for every Internet-connected computer. Open Door's DoorStop Personal 1.1 fills the bill by providing inexpensive individual protection that's easy to configure and relatively unobtrusive.



Danger, Will Robinson! You can configure DoorStop Personal to alert you of connection attempts.

You install DoorStop Personal on each Mac you want to protect; it runs invisibly in the background, intercepting all incoming TCP/IP connection requests. (The $299 DoorStop Server Edition offers server-specific security features for AppleShare IP, StarNine's WebStar, and Open Door's ShareWay IP Professional.) Its Web-based documentation is easy to view but difficult to print; a PDF guide would be more useful.

DoorStop's straightforward administration application lets you either deny all incoming connections or permit selected protocols and users. It starts up in Basic mode, which denies all traffic by default but has some preconfigured options to admit Web, file-sharing, and program-linking requests. If you further restrict access by IP-address range, you can easily permit other users on your own network while excluding Internet visitors. The administrator's Advanced mode lets you get under DoorStop's hood to configure individual TCP/IP services by port number.

Once you've configured DoorStop and turned it on, you can quit the administration application. The program optionally notifies you with a nonmodal pop-up dialog box whenever it turns away a connection request, and it can log these events to a disk file as well. It does not, however, let you override DoorStop's protection on a case-by-case basis, forcing you to reconfigure the program for even one-time access.

We found that DoorStop had no performance impact on even high-speed LAN Internet connections. However, it had some difficulty with FTP, which uses incoming connections to download files even if you initiate the session from your own computer—DoorStop blocks these incoming connections. Other firewalls have found a way around this problem, but with DoorStop, you must use one of several workarounds described in the documentation.

Macworld's Buying Advice If you're using a continuous connection, you need a firewall—it's simply not optional in today's dangerous Internet environment. Despite some minor problems, DoorStop's low price, easy setup, and unobtrusive operation make it a great choice.—MEL BECKMAN

RATING: ♦♦♦½ **PROS:** Easy to configure; optionally logs and notifies you of access attempts; allows selective access by IP address. **CONS:** No ad hoc access override; clunky handling of FTP. **COMPANY:** Open Door Networks (541/488-4127, www.opendoor.com). **LIST PRICE:** Single license, $59; 5 licenses, $199; 50 licenses, $1,299.

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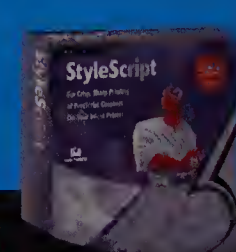

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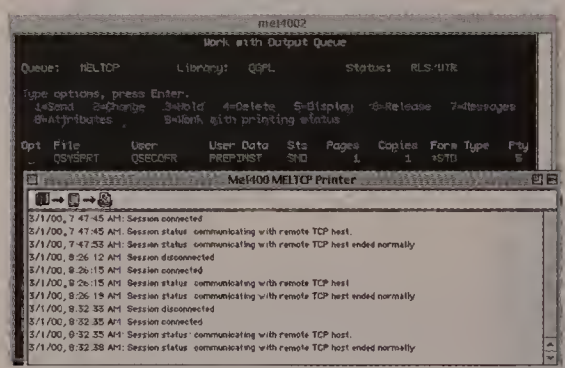
Celview 2.0

IMPROVED ACCESS TO MAINFRAME AND AS/400 APPLICATIONS

THE RESURGENCE OF THE MAC as a desktop appliance makes it an attractive alternative to dumb terminals for "big iron" enterprises running IBM mainframe and AS/400 systems. When combined with Mac OS X's Netboot, for example, an iMac is a compact, elegant, easily managed mainframe terminal. Cel Corporation's Celview is the premier terminal-emulation tool for users who need access to these systems, providing SNA (Systems Network Architecture) gateway, file-transfer, keyboard-mapping, and macro-programming capabilities. The 2.0 incarnation adds to this list Netboot and OS 9 multiuser support, TCP/IP printing, PCI Token Ring compatibility, and a host of other refinements.



Your Prints Will Come Celview 2.0's TCP/IP printing support lets you redirect printed output from any AS/400 or mainframe to your Mac for local output.

You install Celview from CD, either directly to a local hard drive, to an OS X Netboot disk, or to any remote user's networked start-up disk. Celview consists of two programs—one for display emulation and file transfer and one for printer emulation. Three control panels let you configure AppleTalk, SNA, and TCP/IP connections. AppleTalk and SNA connections require an existing AppleTalk or SNA gateway; the TCP/IP tool can connect directly to any mainframe or AS/400 host via a TCP/IP LAN or the Internet.

Before initiating a connection to a host system, you define the connection type and destination host using one of these control panels, saving the connection type as a session document. You can then access any preconfigured session by double-clicking on a session document. This approach lets you easily distribute specific session configurations to end users, either via standard file sharing or as part of a Netboot setup.

Celview now includes a printable PDF help document in addition to comprehensive online help text. A handy on-screen tool bar provides shortcut access to many functions, though the tool bar still has no text labels or pop-up hints. Keyboard mapping lets you drag and drop a terminal-emulation function to any Mac keyboard combination, and Celview displays hot-spot buttons for point-and-click access to function keys.

Celview's TCP/IP print function now lets you receive and print output from any remote host supporting the LPR (Line Printer Remote) protocol. You can queue printouts for later output, preview printing on-screen, or save printouts to disk. The only flaw in Celview's printing feature is its limited information about the status of incoming printouts.

Macworld's Buying Advice Whether you need to support legacy-system access for one user or a hundred, Celview 2.0 makes your job easy. And this release's support for OS 9 and Netboot gives the Mac an edge over Windows boxes for low-cost deployment to multiple users.—MEL BECKMAN

RATING: ♦♦♦♦ **PROS:** Keyboard mapping and palettes; TCP/IP printing; FTP file transfer. **CONS:** No tool-bar labels; limited TCP/IP printing information. **COMPANY:** Cel Corporation (780/438-2323, www.celcorp.com). **LIST PRICE:** $299.

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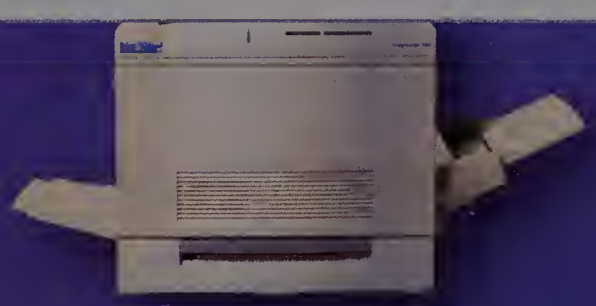

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Deathmatch 101: Intro to Fragging

REDUCE YOUR DOWN-AND-OUT TIME WITH THESE 3-D-SHOOTER TIPS

by Christopher Breen

Recently, it dawned on me that I cling to beliefs some might consider peculiar. No, I'm not here to discuss my convictions that one should avoid eating any vegetable resembling a brain and that a brown paper towel, when placed in your mouth, immediately sucks all the moisture from your body, leaving you a withered, crumpled husk. Rather, I want to talk about my long-held belief that in games—both virtual and real—force inevitably triumphs over finesse.

Seeing this notion spelled out in stark print makes it appear all the more fatheaded, but follow along with me for a second. Does it or does it not seem plausible that if you hurl a bowling ball down an alley at 120 mph, rather than 12 mph, and strike a couple of pins, more pins will likely fall thanks to collateral damage inflicted by the ricocheting objects your ball struck? Likewise, if you shoot a cue ball out of a cannon and biff the 15 colored balls on a pool table—presuming, of course, that the balls don't shatter, slaughtering anyone standing within a hectare of the table—wouldn't you suspect the odds would be greater that, with all that movement, more balls would eventually drop into the pockets?

I hold this principle to be self-evident. Yet when I've attempted to apply it to other areas of gaming, it falls flat. Take my recent online forays into Quake III Arena and Unreal Tournament, for example.

I hurl myself into these contests, gather the gnarliest weapons and most robust armor on the map, and send a message to my enemies that I'm the baddest mo-fo (monster of force) in the land, but before I take a step, some joker with a single health point and a peashooter scatters my giblets from one end of the game to the other. Having suffered this kind of humiliation a dozen times or more—*and* from players who excuse themselves at 6 p.m. because they have to meet the rest of the local Cub Scouts at Billy's house to work on getting their Comportment badges—I started to rethink my strategy.

After trying a few new techniques—and actually paying attention to what was

going on around me—I discovered that although brawn and catlike reflexes aren't entirely wasted in these games, those who use their brains inevitably win the day. Allow me to share some of what I've learned along the way.

Taking Control

Playing these games isn't like driving an automobile. With a car, you have to conform to the vehicle's controls—right foot for the accelerator, left foot for the clutch, right hand to shift and steer, and left hand to hold the cell phone that puts you and the drivers around you in mortal danger.

Although games such as Quake III and Unreal Tournament come with a default set of keyboard assignments, there's not a reason on earth you should stick with them. Nor should you be at a disadvantage because some of your online opponents use the multibutton mouse that came with their PC while you're stuck with the one-button, round rodent flung into the box with your iMac DV.

Start by procuring a mouse with more than one button. You'll naturally want to assign the firing command to the left mouse button (unless you're left-handed), but how you configure the right mouse button depends on personal taste. Some adventurous players use this as the forward-movement button in conjunction with keyboard keys Z, for strafing left; X, for backward movement; and C, for strafing right. These same players keep the spacebar as the jump-command key; use either the option or control key for Unreal Tournament's Alternate Fire command; and assign the A, S, D, and F keys to particular weapons (Quake's rocket launcher, shotgun, plasma gun, and rail gun, for example).

Others maintain the default setting for the movement keys (W, A, S, and D) and use the right mouse button for jumping, Unreal's Alternate Fire, or—for those who love sniping—zooming.

continues

Modern mice often boast a scroll wheel that some players use to cycle through weapons. I'm not keen on cycling weapons—I prefer to get the weapon I want *when* I want it with a key command—but if you aren't using the wheel for anything else, this is a reasonable assignment.

Once you've found a keyboard and mouse configuration that feels right to you, practice, practice, practice against the bots. Before going up against human opponents, you should be comfortable running backward, dodging sideways, leaping about like a hyperactive baboon in a trampoline factory, rocket jumping (setting off a rocket at your feet to gain serious altitude as you jump), and producing exactly the weapon you want in an instant.

Know the Lay of the Land

Both Quake III and Unreal Tournament provide you with a single-player mode not only so you can practice against bots, but also so you can scope out the games' many maps. In Unreal Tournament, before the game starts, take the time to fly through the map and learn where all the weapons, armor, and power-ups lie. In Quake III, choose Skirmish mode and configure the match so there are no enemies to get in the way of your explorations.

Dangerous Intersection The railgun and armor found at this intersection in Quake III Arena will likely attract plenty of targets. With your own railgun and a protected hiding place, you can quickly rack up frags.

Bird's-eye Blasting From this lofty perch, you can control large areas of the game, as well as rain fire upon a crowded intersection.

Prevent Defense

One of the secrets to Deathmatch success is knowing where the goods are and making sure you have 'em and other players don't. If you can manage to take a particular weapon, power-up, or piece of armor temporarily out of the game—and out of another player's hands—by cleaving it to your bosom, do so. If your health is maxed out, do yourself the tiniest bit of harm by facing a wall and setting off a weapon that damages you, then grab the health power-up. This is easier in Quake III, where the plasma gun causes only two points of damage. Unreal Tournament's weapons either do no damage or sap half your health if you're right up against the wall, so before trying this trick, take two or three steps backward.

This preventive strategy may do little for your power or health, but it could seriously undermine a player who possesses only a puny weapon or is in desperate need of some righteous healing. Learn how often the most powerful items spawn and try to be nearby when they do.

Listen Up!

Keep your ears open. Both Quake III and Unreal Tournament provide aural clues to the location of your enemies. If you hear a series of armor shards being gobbled up and you know those shards live right around the corner, you can place your enemy and plan accordingly. And listen for players respawning—these born-agains lack worthwhile weapons and make easy pickings.

Be Unpredictable

There's nothing more natural than running around the right side of a pillar and emerging on the left. Unfortunately, this is *so* natural that other players will expect you to do just that, and will plant a rocket in exactly the spot where your next steps will take you. To avoid becoming another notch in someone's BFG, do the unexpected—double back instead of going around that pillar, vary the directions you dodge and turn, and sprinkle a few leaps into your movement. And to be a better hunter, look for patterns in other players' movements.

Quick Tips

These tips require little explanation but can be very helpful:

- Maintain the high ground. Raining death from above is more effective than attacking from below.
- Rocket jump (or impact-hammer jump) from bounce and accelerator pads and elevators to gain more height. This can surprise someone waiting for you at the other end of a pad.
- Target spots where other players are likely to appear—for example, the nexus of two hallways, an opening to a courtyard, the location of a particularly juicy power-up or weapon, or a spot where players land after using a bounce pad.
- Try to predict where your opponent will be. Few weapons fire instantly, so you need to guess where your enemy will be a few seconds after you shoot.

And there you have it—all the tips, tricks, and techniques you need to stay on your feet and reduce your opponents to their component parts. Happy fragging! If I don't see you online, I'll see you at the pool hall (I'll be the guy with the howitzer). **m**

Contributing Editor CHRISTOPHER BREEN hopes that the force of his personality will compel you to explore his coauthored book, *My iMac* (IDG Books Worldwide, 1999).

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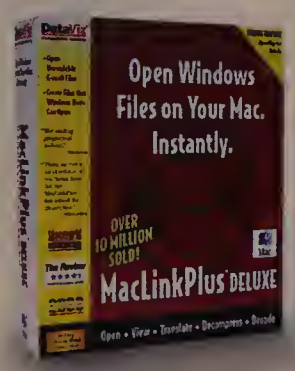

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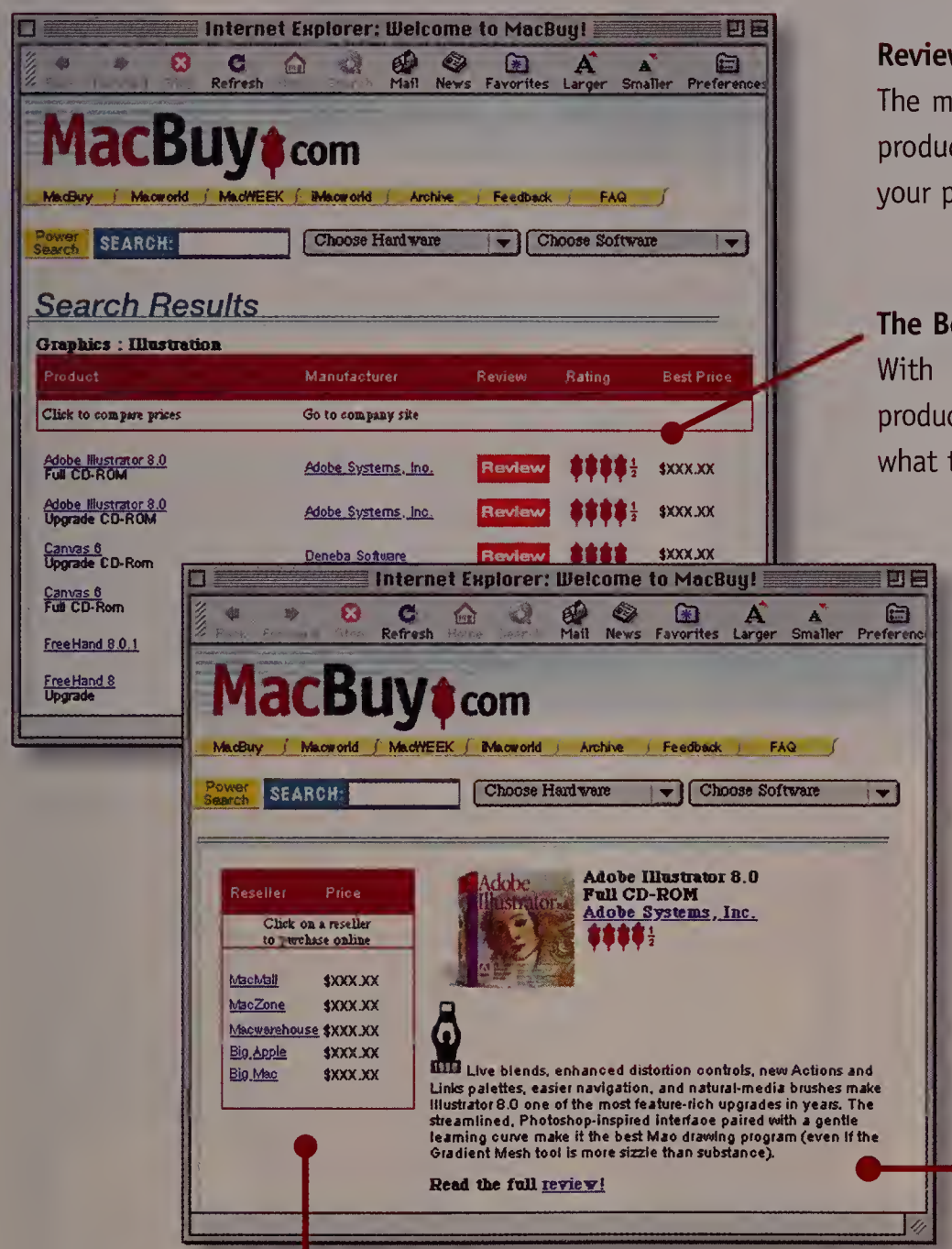

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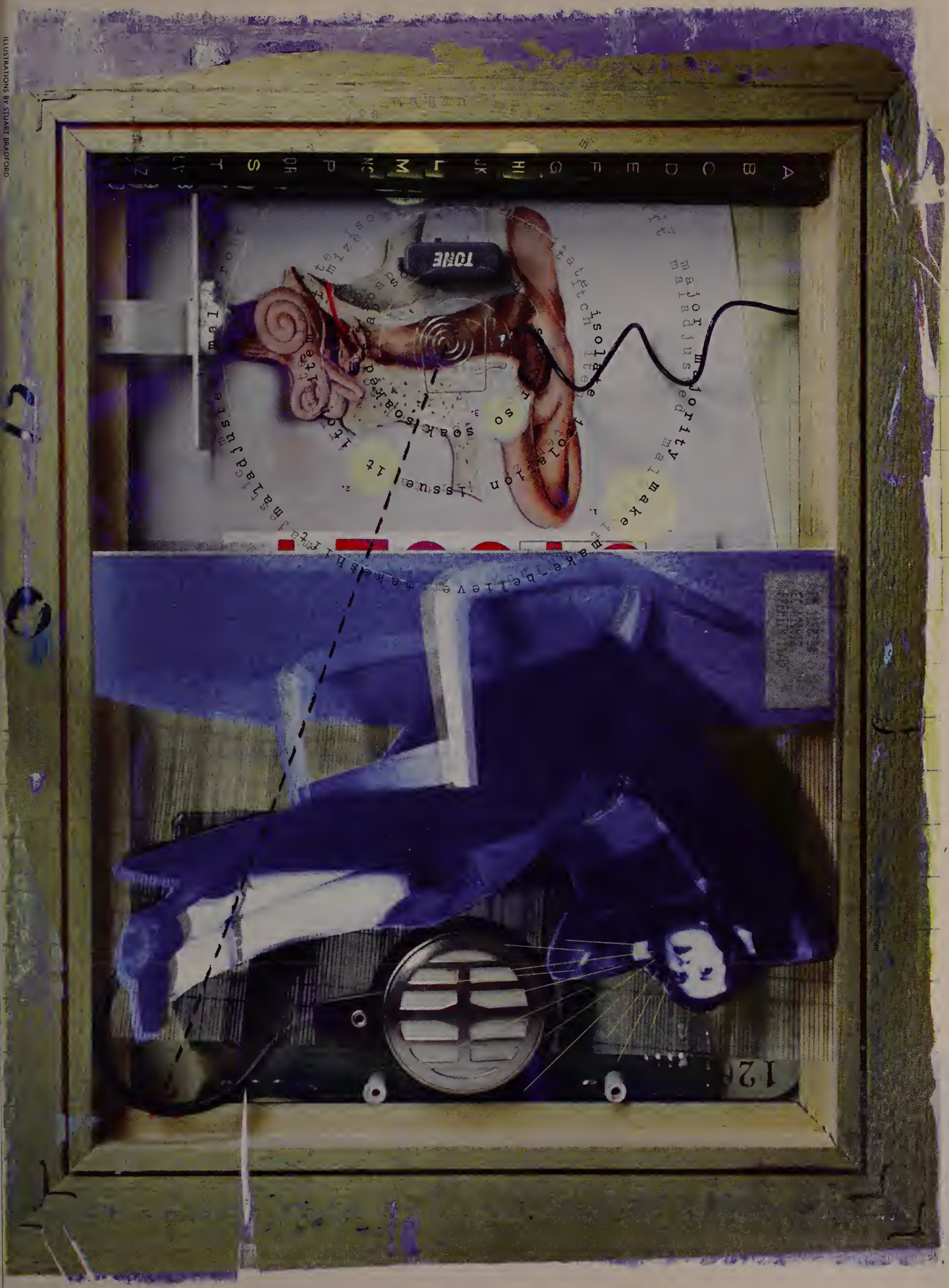


ILLUSTRATIONS BY STUART BRADFORD

PREPARE TO CAST OFF YOUR MICE, MAC USERS!

THE AGE OF MAC SPEECH RECOGNITION

HAS ARRIVED.

Listen Up

by David Pogue

Ever since *Star Trek* first aired, computer users have longed for the day they could do away with their clunky and uncomfortable mice and keyboards. Think how effortless and natural it would be to communicate with your computer just by talking to it.

Speech makes an ideal form of person-to-machine interaction—not just for people with repetitive strain injuries but also for people who'd like to *avoid* injury and just about anyone with work to do and not enough time to do it. Speech recognition on the Mac has remained largely a sci-fi fantasy, however. (Remember, if you will, the scene in the movie *Star Trek IV,* when Scotty hilariously attempted to talk to a Mac Plus by using its mouse as a mike: "Computer? Hello—computer?") We've watched in dismay as the Mac's early lead in speech recognition—spearheaded by its ten-year-old PlainTalk technology—eroded. Today the Windows platform offers four different commercial programs that don't just allow you to launch programs by voice, à la PlainTalk, but actually let you *dictate* text—almost as fast as you can talk.

With the newest era of Steve Jobs, however, the landscape has changed. Apple's speech engineers have made PlainTalk more powerful. New G4 Macs offer processor-taxing speech-recognition software more power than ever before. And Apple actually reached out to prominent speech-recognition companies, such as Dragon Systems and IBM, to help them get started on their own Mac speech-recognition products.

Without a doubt, the Mac is seeing the dawn of its speech age. IBM's dictation software for the Mac is already available, and rivals are in the works for the coming year (see the table "Speech Recognition on the Mac—Today and Tomorrow"). But because this kind of software is so unfamiliar to Mac fans, a road map through the different kinds

of speech recognition is long overdue. This guide will help you become familiar with the lay of the land and understand what you can expect from current and future Mac speech products.

What's Speech Recognition?

First, a reality check: computer-based speech recognition will never work as smoothly as it does for the *Star Trek* crew. As your average married couple demonstrates, even *people* can't always understand people, let alone computers. And as the sidebar "What's That Again?" demonstrates, even the smartest software on earth can't distinguish, for example, "hyphenate" from "-8."

Furthermore, the USS *Enterprise* gang never had to distinguish between the two types of speech products: *command-and-control* programs, which let you control your computer by voice—for example, open a program or click on a menu item—and *dictation* programs, which turn spoken words into typed text.

When Apple says that Mac OS 9 offers speech recognition, for example, Apple refers to PlainTalk, its command-and-control software. Dictation software, on the other hand, turns your Mac into a virtual secretary, capable of typing your letters, memos, and e-mail messages as you speak. You can buy either *discrete* dictation (which requires you to pause . . . between . . . words) or *continuous* dictation programs (which let you speak normally). The Mac already offers both types of dictation programs, and programs that combine command-and-control power with dictation are in the pipeline.

The Voice Software You Already Own

If you're curious about speech recognition but aren't ready to spend big bucks for it, you may be surprised to learn that you already own a speech-recognition product: PlainTalk. This command-and-control software has been part of Mac OS for years.

Surprisingly few Mac users have ever tried PlainTalk. Maybe that's because, until Mac OS 9, what PlainTalk could do was so limited. Or maybe it's because PlainTalk isn't installed automatically—you must use your system CD's Custom Install option to get it. Or maybe it's because some Macs don't have a microphone. You can use the PlainTalk microphone that comes with Power Macs; a headset microphone; or with less accuracy, the one built into the monitor of iMac and PowerBook models. With the $25 Griffin iMic adapter (615/255-0990, www.griffintechnology.com), you can even plug a standard mike into the iBook.

Your First Words After you install PlainTalk, a cartoon character of your choice appears in a floating window on your screen (see "Plain Talking"); this is the front end of the Mac's speech-recognition feature. When you speak, your words—if PlainTalk understands them—appear printed in this little window. If you say "What time is it?" the current time also appears there.

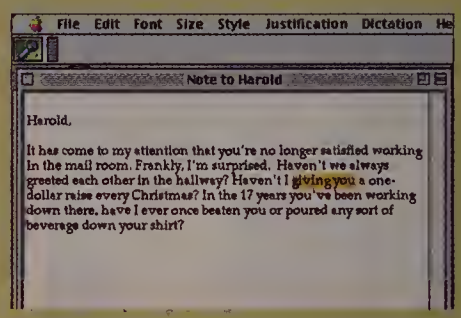
Your Apple menu, meanwhile, will offer a new Speakable Items folder whose submenu lists 48 voice commands PlainTalk can recognize. Many are extremely useful: "close all windows," "find a file," "hide all applications," "insert my name," "restart the computer," and so on. A few have no convenient keystroke or menu equivalents—"quit all applications," "take a window picture," and "tell me a joke," for example.

Mac OS 9's PlainTalk can also click on dialog-box buttons such as OK, Cancel, Quit, Yes, and No when you say their names. In Mac OS 9, PlainTalk is also capable of using application-specific commands; for example, in your Web browser, you can say "go back," "go forward," "page down," "go home," and so on.

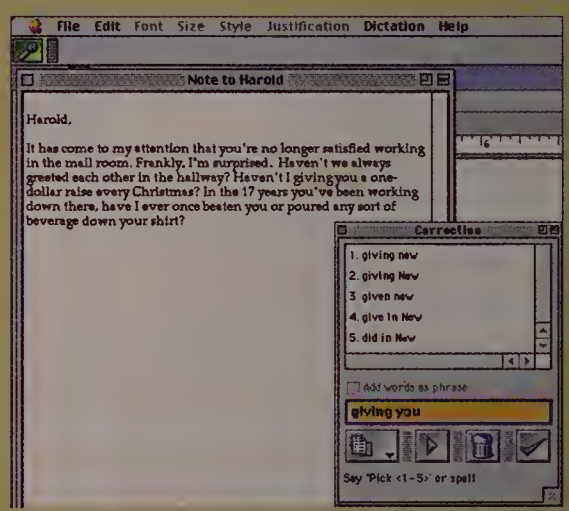
ANATOMY OF A FIX

If your dictation program lets you make random-access corrections by voice—as do IBM's ViaVoice for Mac and most Windows speech-recognition programs—the process works like this:

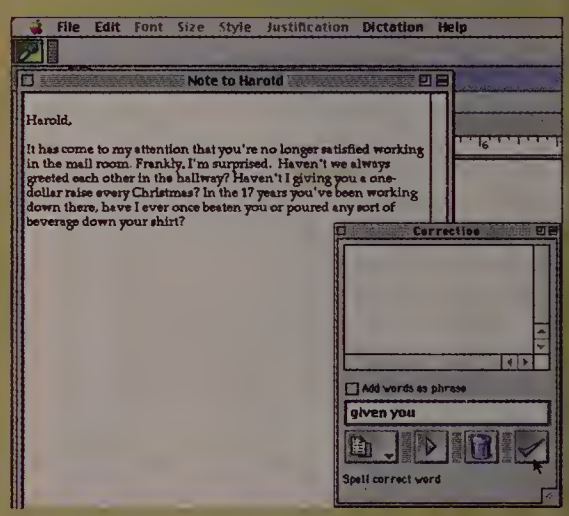
1. You notice an error and say, for instance, "Correct *giving you*." ViaVoice highlights those words.



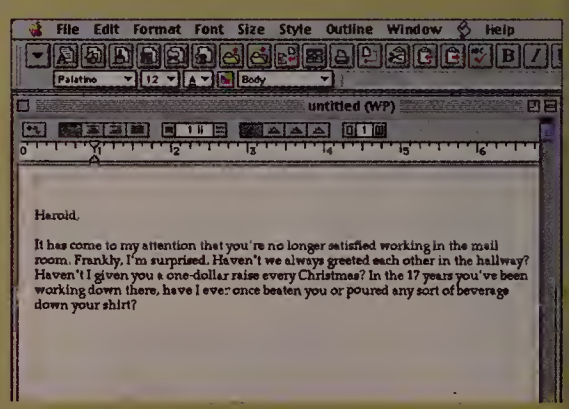
2. The program then brings up its closest guesses. If one of the proposals is what you want, say "pick 3" (or the number that you want) to make the correction, and then go on.



3. If you're not sure what you said, click on the play (triangle) button to replay your voice. You can type what you intended or spell it out loud. Then click on the check mark to make the correction.



4. When you're finished editing, say "Transfer to AppleWorks." Your text appears instantly in that program (or in Word, AOL, Navigator, or Outlook Express).



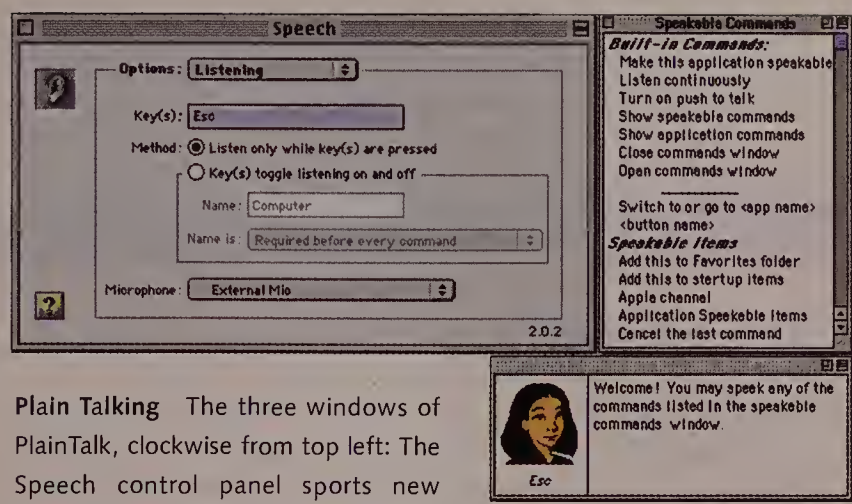
In other words, PlainTalk is great for people who like to keep their hands on the keyboard and off the mouse. Using your voice to switch programs, turn File Sharing on and off, or switch monitor settings lets you save time and avoid the mouse.

PlainTalk Power Visit the Speech control panel to gain more control over PlainTalk. Choose Feedback from the Options pop-up menu to specify when the Mac listens to you; you don't want it trying to respond when you're talking on the phone or to coworkers. (That could be disastrous: "Man, it's cold in here. Hey, Chris, *close the window*, will you?") You can choose a key to press when you want the Mac to listen—your choices are the escape, tilde (~), delete, F5 through F15, and numeric-keypad keys. After that, whenever you speak to the computer while you're pressing that key, PlainTalk listens. You can also specify a name that tells the Mac when you're speaking to it, such as Computer—"Computer, close the window," for example. In general, though, this solution is less accurate and less convenient than using a key.

AppleScript Is Your Friend In Mac OS 9, PlainTalk has become much more reliable and much more powerful, especially if you know how to write AppleScripts. (To learn more, see "AppleScript for the Programming-Shy," *Secrets*, November 1999.) By creating the appropriate AppleScript, you can make the Mac do almost anything—and after putting the saved AppleScript icon into the Speakable Items folder, you can trigger your script by speaking its name. You can also put aliases of your favorite icons—programs, documents, disks, folders, and so on—into this folder and open them just by speaking their names.

The Next Step Up

If a few minutes of experimentation tell you that PlainTalk might fit into your work habits, then proceed immediately to MacSpeech's Web site, www.macspeech.com. There you'll find a free PlainTalk enhancement called ListenDo. The first release from this tiny, scrappy company, ListenDo instantly doubles PlainTalk's usefulness by letting you use it to control menus.



Plain Talking The three windows of PlainTalk, clockwise from top left: The Speech control panel sports new options, such as this one asking when you want the Mac to listen. The Speakable Commands list, which you can summon by voice, helps you learn what commands PlainTalk understands. And the Feedback window shows a transcription of whatever PlainTalk hears you say, along with friendly responses.

You can say "File menu," for example, to pull down the File menu—and then "Page Setup" (or whatever other command you want). Delightfully, ListenDo can even open such unlabeled menus as the Instant Palm Desktop menu, Apple menu, application menu, Aladdin Magic menu, and so on.

PlainTalk on Steroids Better yet, ListenDo offers a clean, easy-to-use interface for creating new PlainTalk commands. Chief among these are *text macros* that let you say, for example, "return address" to trigger the rapid typing out of your complete return address. Because PlainTalk can learn only a limited number of phrases, ListenDo doesn't count as true dictation software. But if you frequently type the same standard paragraphs when answering e-mail or writing medical notes, ListenDo might be an ideal—and free—way to cut down on typing time.

ListenDo's other commands let you press a particular key; type a particular word; or with the use of an add-on command

TWO WAYS TO CORRECT

Every dictation program makes errors (see the sidebar "What's That Again?"). If you're considering a dictation program, the big question is, Can you correct an error anywhere on the page or only within backspacing range?

This issue is enormous, affecting both the design of these programs and their ability to interact with other software. For example, when you correct a word in Voice-Power Pro, the program *backspaces* all the way to the error, replaces the faulty word, and then retypes everything up to the point where you stopped. Because the delete key works in any program, Voice-Power Pro (like MacSpeech's upcoming iListen) works with any program. But you pay a price for this correction method: the instant you press a mouse button, switch windows, or press an arrow key, the program loses track of the cursor's position—and can't make a correction.

Far better is *random-access correcting*, where you can select, format, or correct a word just by saying it—"Correct *fishing*," for example—even if the word is several paragraphs back. Such a program highlights the word with pinpoint accuracy and offers a list of replacements (see the sidebar "Anatomy of a Fix"). IBM's ViaVoice for Macintosh and most Windows dictation programs work this way.

From a programmer's point of view, however, it's spectacularly difficult to permit random-access correcting unless you also write the word processor itself. That's exactly why ViaVoice can transcribe only into its own included word processor. NaturallySpeaking for Windows offers random-access correcting in Microsoft Word and WordPerfect, thanks to special programming efforts; in most other programs, NaturallySpeaking uses the backspacing method to make corrections. Even Windows dictation software doesn't offer the Holy Grail of dictation software: the ability to make a random-access correction in any application.

set called a ScriptPak, perform functions within specific programs. For example, the AppleWorks ScriptPak lets you say "find synonym," "make a new spreadsheet," "double-underline it," and so on. The company says that it will eventually sell additional ScriptPaks for many popular Mac programs. You can download ScriptPaks from MacSpeech's Web site for between $10 and $20 apiece.

An Oldie but a Goodie

Although basic command-and-control speech-recognition software has been on the Mac for a while, dictation software has remained scarce. The first Mac program capable of transcribing your spoken words was called PowerSecretary. At $2,500, it was obscenely priced, especially considering that you . . . had . . . to . . . separate . . . each . . . word while you were speaking. Thousands of people who couldn't type, or didn't want to, bought it anyway. (Thanks to a wrist-trashing syndrome called tenosynovitis, I was among them.)

Two years ago, its maker, Articulate Systems, was reabsorbed into its parent, Dragon Systems, which abandoned the project. Now a British company, GT Value Europe (www.voicepowerpro.com), has updated PowerSecretary for Mac OS 9 and sells it for $140, including a headset microphone, under a new name: Voice-Power Pro. For consumers in the United States, it's available only from mail-order outfits such as MacMall (www.macmall.com).

Anyone who has sampled the heaven of continuous-dictation software such as IBM's ViaVoice may experience frustration at Voice-Power's requirement that you separate words when speaking. Furthermore, the program doesn't offer *random-access correcting* (see the sidebar "Two Ways to Correct"). On the other hand, Voice-Power can dictate into any Mac application—anywhere you can type—and works even on older, slower Macs. Best of all, it's *also* a command-and-control program. You can manipulate your menus, windows, icons, and applications by using CE Software QuicKeys, AppleScript, or Voice-Power's built-in scripting language. At this point, old or not, Voice-Power Pro is the only Macintosh program that can handle both dictation and command-and-control programs.

Dictation Elation

The biggest Mac-speech news of the new century is ViaVoice Millennium Edition for Macintosh, an impressive effort from IBM. With this inexpensive ($90), very accurate dictation-only software, you can for the first time use continuous speech to input text on the Macintosh.

As the accompanying review notes (see the sidebar "ViaVoice Millennium Edition for Macintosh"), ViaVoice isn't perfect. Its biggest drawback is that it requires you to dictate into its own SimpleText-style window. Yes, you can vocally command ViaVoice to copy your dictated words into AppleWorks, Microsoft Word 98 and Outlook Express, Netscape Messenger, or America Online. But most Mac users long for a way to dictate directly into *any* Mac program, even if it means they have less control over how they correct mistakes.

Hopes for the Future Fortunately, when it comes to accepting customer feedback, IBM is one giant eardrum; in February, the company even began paying $100 to each customer who signed up on its Web page to participate in its four-month ViaVoice-for-Mac improvement plan. It's almost certain that the next version of the program will let you copy your dictated text into a wider array of Mac programs than the five supported in version 1.0. Already, authors, doctors, lawyers, students, and others are productively using ViaVoice instead of typing; an improved version will further widen its appeal.

The Best Is Yet to Come

For many of us, the ultimate fantasy remains just beyond reach: a Mac version of Dragon NaturallySpeaking.

The Windows version of NatSpeak, as insiders call it, represents the state of the art in dictation software. It's extremely fast and accurate. It can also serve as command-and-control software, letting you, for example, move your mouse's cursor around the screen. Speaking naturally and continuously, you can watch your words pour directly into most Windows programs. You can even transcribe voice recordings from a digital pocket voice recorder: after recording a draft of a speech while away from your desk, connect the digital recorder to your PC, press Play, and watch as NatSpeak types your words. And unlike

WHAT'S THAT AGAIN?

Speech-recognition software is amazingly accurate these days, but it still has its weaknesses. Over the years, I've kept a list of some of the funnier mistranscriptions Dragon NaturallySpeaking for Windows has made. When you look over these goofs, it strikes you not how dumb these programs are, but how ingenious.

What I Said	What It Wrote
an enormous number of variations	an enormous number of very Asians
there was no	therewith snow
more along the lines	Maura Long the lines
Motorola	motor roll a
modem port	mode import
breakable	break a bull
a procedure	upper seizure
and then stick it in the mail	and dense thicket in the mail
movie clips	move eclipse
I might add	I my dad
a paramedic	up aromatic
minority	my nor it he
a nameless feeling	an aimless feeling
inscrutable	in screw double
oxymoron	ax a moron

ViaVoice Millennium Edition for Macintosh

FOR A 1.0 VERSION, IT'S SWEET AND ACCURATE DICTATION SOFTWARE

The Mac is cool again, and major software companies are bringing versions of their best-sellers to this market of 25 million users. IBM, with its ViaVoice Millennium Edition continuous-speech dictation program for the Mac, is a great example.

ViaVoice is an astonishing bargain at $90, which also buys you an excellent noise-cancellation headset microphone from Andrea Electronics that costs $40 sold separately. The headset even includes a comfortable ear speaker, which lets you listen to your Mac read text back without bothering other people in the room. The headset includes five sets of translucent accent panels—one for each iMac fruit color.

First, the Bad News

One whopping limitation saddles the software: you can dictate only into its own SimpleText-style word processor. (For the rationale, see the sidebar "Two Ways to Correct.") From there, you can use your voice to paste what you've dictated almost instantly into one of five programs: America Online, Microsoft Word 98 and Outlook Express, AppleWorks, or Netscape Messenger. This setup isn't so bad, but anyone who's ever experienced the thrill of dictating directly into Word (using a program such as Dragon NaturallySpeaking for Windows) will ache for the same kind of directness on the Mac.

Otherwise, the news is mostly good. The beautifully designed package shines with attention to Macintosh-specific detail at every step. For example, the Setup Assistant doesn't just tell you to plug the headset cable into the microphone jack on your Mac—it actually shows a photograph of *your Mac*'s back panel, having figured out what model you've got.

ViaVoice then asks you to acquaint the software with your particular voice by reading several screens of text aloud. On a Power Mac G3/300, reading the shortest of these excerpts (from *Treasure Island,* for example) takes about 15 minutes. The software then analyzes the sound files it has recorded for about 30 minutes.

After that, the fun begins. From the permanent ViaVoice icon on your menu bar, you launch the SpeakPad application (this is a lot like SimpleText). You put on the headset, start talking—and absolutely nothing happens. Then, suddenly, at the first pause in your speaking, the transcription of your words appears on screen.

It Works

On your first afternoon, you'll get about 95 percent accuracy, which means you'll have to correct 1 out of 20 words. The accuracy creeps upward as you keep using the program and making corrections. An optional (but recommended) feature lets you import writing you have already done so that ViaVoice can learn odd words that crop up in your line of work—such as *twelvish* and *Clintonesque*—further improving accuracy.

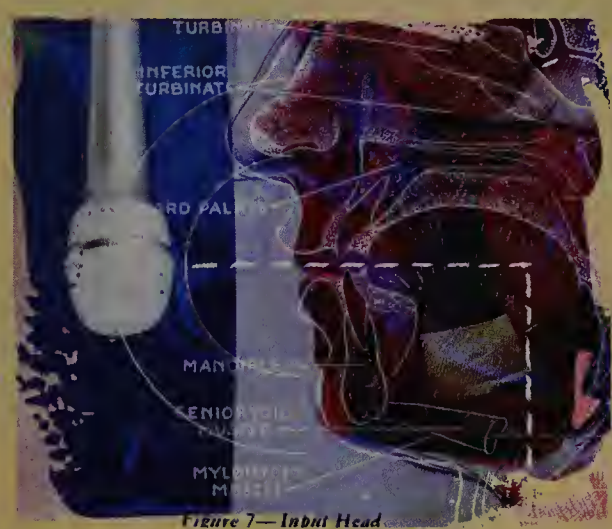


Figure 7—Input Head

You can make corrections entirely by voice. Unfortunately, after you make a correction, your insertion point stays blinking at that spot in the text—usually several phrases behind your dictation. You're forced to click at the end of your document to resume. As we went to press, IBM released a free update that fixes this. Download it at www-4.ibm.com/software/speech/support.

Other glitches: the default way to capitalize a word is unwieldy. You have to say "capitalize this" before the word. (In NaturallySpeaking, you just say "cap.") To change this, choose Dictation: Edit Macros

The Speed of Thought

Is ViaVoice faster than typing? It certainly isn't as fast as the best Windows dictation software, and it plods on 233MHz Macs (the minimum suggested platform). On an iMac DV, you wait about one second after each utterance for the text to appear on screen.

But on the first day of using the program, most touch typists will probably average the same speed they get when typing. As you and the program get to know each other, the speed of dictating pulls ahead. In the end, though, what you'll discover is that ViaVoice's speed is mostly irrelevant. The bottleneck, when you write by dictating, isn't the computer—it's your brain. As you sit there, mentally composing each sentence before you speak it, the software winds up waiting for *you*.

Macworld's Buying Advice

If you're a person who can't, or doesn't like to, use the keyboard, ViaVoice is a breakthrough on the Macintosh. To be sure, the fact that ViaVoice confines you to dictating in a proprietary word processor brands it as a version 1.0 product. But at least IBM put its emphasis on the right areas: accuracy and a fanatical devotion to the Macintosh way. The program is dirt cheap and comes with a 30-day guarantee. Anyone who types any text longer than URLs each day should investigate this remarkable program, if only to become acquainted with the thrill of real Mac dictation software before ViaVoice's more powerful rivals—including its own updates—arrive later this year.

ViaVoice Millennium Edition

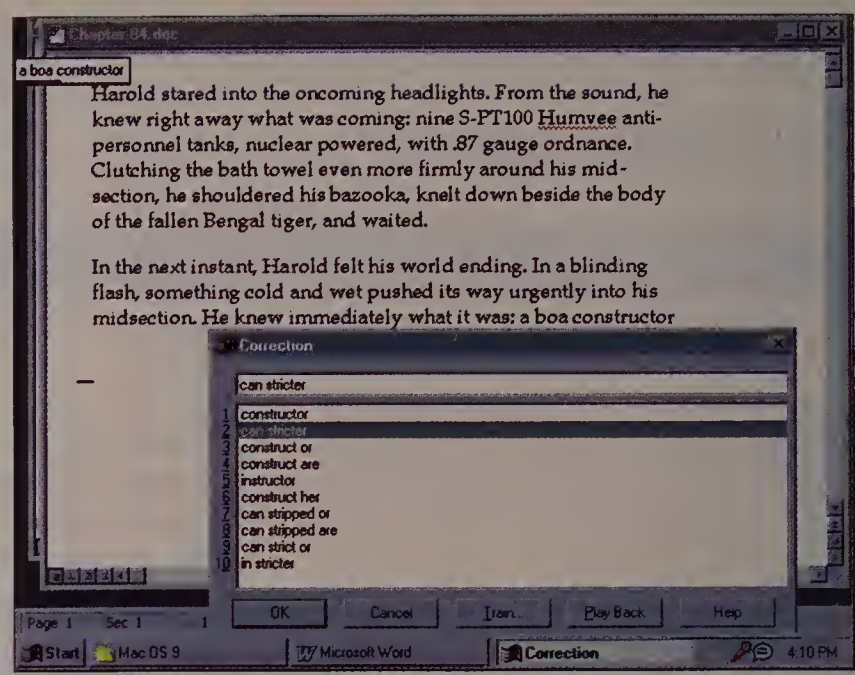
RATING: ♦♦♦½ **PROS:** Accurate; inexpensive; the only continuous dictation program on the market. **CONS:** Dictates only into proprietary word processor; slow. **COMPANY:** IBM (800/825-5263, www.ibm.com). **LIST PRICE:** $90.

the other hot speech programs for Windows—such as IBM ViaVoice and Philips FreeSpeech 2000—it's well integrated with Microsoft Word *and* Corel WordPerfect.

The Dragon Uncertainty Dragon announced in May 1999 that it would introduce a Mac version of NatSpeak late that year. But now, even after demonstrating an impressive prototype in November, the company says it will wait until Mac OS X ships and then reevaluate the Mac project. If Dragon does back out of its commitment to bring a product to the Mac, it's missing a whopping and profitable market, as ViaVoice's sizzling sales indicate.

MacSpeech to the Rescue? Even as that hope fades, however, another one rises: MacSpeech says that it has nearly finished merging dictation technology (licensed from Philips) with its existing ListenDo program. The result, iListen, will therefore offer *both* command-and-control and dictation features. The new iListen works with any Mac program, says the company, although it makes corrections by using the rapid-backspacing method. The company hopes to ship iListen by the July 2000 Macworld Expo at the latest.

Best of all, MacSpeech has developed a technology kit that allows any software company to make its products "speech-ready." Speech-ready programs permit random-access corrections, eliminating the drawback of iListen's backspace approach. According to MacSpeech, several software companies already plan to incorporate the technology into future versions of their products. (You can keep in touch with these and other Mac speech developments by signing up for the free, independent Mac Voice mailing list at www.themacintoshguy.com.)



Naturally Correcting Dragon NaturallySpeaking for Windows comes with a module that lets you make random-access corrections in Microsoft Word or Corel WordPerfect. The tiny floating window at top left shows what the program is "hearing" as you speak; the correction process, shown here, works exactly as it does in IBM's ViaVoice Millennium Edition for Macintosh.

The Last Word

If things go according to plan, this year should be a big one for all Mac users who long to take their hands off their keyboards and mice and simply speak. One day soon, you may have the ultimate luxury: a technology that lets you dictate into any Mac program, with random-access correction of wrong words *and* voice control of menus, dialog boxes, and windows. Can you say "I can't wait"? **m**

DAVID POGUE (www.davidpogue.com) is the creator of the *Missing Manual* series (http://missingmanual.com). Having trashed his wrists in the mid-1990s, he now writes exclusively with dictation software.

SPEECH RECOGNITION ON THE MAC—TODAY AND TOMORROW

	PlainTalk	ListenDo	Voice-Power Pro	ViaVoice Millennium 1.0	Dragon Naturally-Speaking [A, B]	iListen [A]
Company	Apple	MacSpeech	GT Value Europe	IBM	Dragon Systems	MacSpeech
List Price	free	free [C]	$140	$90	TBD [D]	TBD [D]
Contact	800/692-7753 www.apple.com	www.macspeech.com	(44) 0181-683-3142 www.voicepowerpro.com	800/825-5263 www.ibm.com	617/965-5200 www.dragonsys.com	www.macspeech.com
Availability	now	now	now	now	unknown	July 2000
WHAT IT CAN DO						
Run AppleScripts	●	●	●	○	TBD [D,E]	●
Open files	●	●	●	○	TBD [D,E]	●
Operate menus	○	●	●	○	TBD [D,E]	●
Text macros	○	●	●	●	●	●
Word-by-word dictation	○	○	●	○	○	○
Continuous-speech dictation	○	○	○	●	●	●
Dictate in any Mac application	○	○	●	○	TBD [D,E]	●
Random-access corrections	○	○	○	●	●	○
Includes headset microphone	○	○	●	●	●	●

● = yes; ○ = no. [A] *Announced, but not shipping or in beta release at press time.* [B] *Final product name not announced.* [C] *ScriptPaks, sets of AppleScripts that give you more control over various applications, cost between $10 and $20 each.* [D] *To be determined.* [E] *Equivalent included in Windows version.*

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Bridge the Gap

New Macs and Old Devices *Can* Get Along—

by Christopher Breen

Imagine waking one morning in a foreign land—one where your greenbacks are worthless, people consider your style of dress bizarre, and you find the language incomprehensible. In order to survive, you'd have to find ways to convert your currency, adopt the local costume, and attempt to make your desires known.

Many Mac users felt similarly displaced a few years ago when Apple no longer included ADB, serial, and SCSI ports—the traditional means of communicating between a computer and peripherals such as printers, scanners, and keyboards—on Macs. Instead, Apple adopted USB for serial and input devices because USB was more universally accepted, and the FireWire bus for storage and video because FireWire was speedier. This was hardly good news if you'd paid good money for older equipment that would still work—if only you could plug it in—or if

NICHOLAS WILTON

Macworld's Connectivity Guide Shows You How

you had an old Mac that was incompatible with a tempting array of new equipment.

Though Apple drew a line in the connectivity sand, other companies have crossed that line for you. Macworld Lab requisitioned scads of devices that help you hook up old devices to new Macs or vice versa, including USB adapters, PCI cards, and PC Cards. (SCSI cards provide another answer; for an entire article on this alternative, see "Generation Gap," August 1999. FireWire connectivity opens a new can of worms, so we leave it for another time.) We put all the devices through the wringer, evaluating their compatibility with an array of peripherals and determining their effects on general performance. For the results of our tests, see "Communication Facilitation." With the aid of that table and the tips we provide, your mishmash of Macs and machinery should coexist peacefully—and *productively*.

Common Connection Questions

BRIDGING THE MAC generation gap can get confusing. These answers to common connectivity questions will help you figure it all out.

How can I transfer data easily from my old Mac to my new one?

Short of physically moving the hard drive from the old Mac to the new one, the easiest and least expensive method is to string an Ethernet crossover cable between the two Macs' Ethernet ports, turn on File Sharing, and transfer files across the network.

You wire an Ethernet crossover cable differently than a standard Ethernet cable. Using a crossover cable, you can directly link two Macs or a Mac and an AirPort Base Station without an Ethernet hub. These cables cost around $10.

When your data-transfer needs are modest, you can copy files onto removable media—Zip, Jaz, Orb, or CD-R—to shuttle data back and forth.

Is there an alternative to using a USB-to-serial adapter to connect my serial-only StyleWriter printer?

Yes. Farallon's $110 iPrint Adapter SL uses the Mac's Ethernet port to print to these older StyleWriters. By plugging in this device (and thus the connected printer), you can share your printer on the network—an option that's not possible with a USB-to-serial adapter.

Can I share my Zip drive between two Macs?

Sure, and you don't need to unplug it from one Mac and carry it to another. You can use a Zip drive just like any other networked drive or server. To share the disk, make sure your Ethernet network is up and running, mount the Zip disk on the remote Mac, and create an alias of it. When you want to copy data to or from the disk, just double-click on the alias to mount the disk.

My MIDI application requires a floppy-disk key to run, but my new Macintosh doesn't have a floppy drive. What should I do?

Rather than muck about with add-on drives, contact the application's publisher. Many copy-protected applications don't require floppy disks. The same is true for software that once required ADB dongles.

Back to Basics

For many Mac users, a computer is a tool, not a strange world to explore. But familiarizing yourself with the back of the box will help you bridge the gap between old and new. If you already have a firm grasp on connectivity technology, you can go directly to the next section. The rest of us might benefit from a brief introduction. See the sidebar "Port Authority" for photos and descriptions of the connector types.

If your desktop Mac doesn't have the kinds of port you need, you have two ways to add them: an adapter or a PCI card. An adapter is commonly a cable with one type of connector (say, ADB) on one end and a port for another type (say, USB) on the other. A PCI card goes in the computer's PCI slot; adding a PCI card with ports is like adding another set of eyes or ears to your machine. Mac portables rely mostly on PC Card slots for the addition of new ports.

NICHOLAS WILTON

New Macs, Old Devices

BUYING A NEW MAC IS EXCITING, BUT SOME OF that sparkle fades when you introduce it to your older equipment and find that they don't all speak the same lingo. The iMac, iBook, PowerBook G3 with FireWire, and Power Macintosh G4 all lack ADB and serial ports and include USB. The blue-and-white Power Macintosh G3 doesn't have serial ports but does include USB *and* ADB ports. All of these newer Macs can communicate with older serial or ADB equipment with the translating help of adapters.

Hooking Up Serial Devices

So your more au courant Mac lacks serial ports, but you don't want to lay out the cash for new printers, modems, or digital cameras. You have several options, the easiest of which is a USB-to-serial adapter. All you have to do is connect the adapter's USB end to your Mac's USB port and the serial end to the peripheral's serial port. We recommend Keyspan's $79 USB Twin Serial Adapter. This adapter, unlike Belkin's $69 USB Serial Adapter for Macintosh or Momentum US's $79 uConnect, allows you to use both serial ports at the same time—helpful if you want to connect a printer and an external modem simultaneously. The Keyspan adapter also supports

all StyleWriters, while the other two accommodate only a few. However, Palm enthusiasts should note that only the Belkin and Momentum adapters carry connectors that fit PDA cradles. CompuCable makes the $70 Mini-Geo, a two-port adapter that needs its own powered USB port for connecting to serial devices. In the same boat is Inside Out's Edgeport 4, which costs a hefty $399 but gives you four ports.

PCI Power You can add serial ports to the blue-and-white Power Mac G3 and the Power Mac G4 without a USB adapter—an attractive alternative if you have better things to occupy your USB ports. To accomplish this miracle, turn to your PCI slots. Placing PCI cards in the slots takes a little more effort than plugging in an adapter, but none of the cards we tested posed any problems.

We looked at four PCI cards that carry multiple serial ports. MegaWolf offers a series of cards that carry two, four, or eight serial ports—

priced at $192, $269, and $568, respectively—and Keyspan markets the $179 SX Pro Serial Card, which contains four serial ports. All four cards work as advertised and have easy-to-use software. Which you choose will depend on your budget, but prices fluctuate. You may find dramatically lower prices online or at your local House of Mac Stuff.

Modem No More As long as you don't need an internal modem, you can also add a serial port to a blue-and-white G3 or a G4 without sacrificing one of its scarce PCI slots. Griffin Technology's $49 gPort is a small device that plugs into the Mac's internal modem slot, replacing the modem with a single serial port. GeeThree's $50 Stealth Serial Port is a similar product.

Talk with the Locals The gPort and Stealth Serial Port both let you connect to printers with LocalTalk, an old communication protocol. (Newer printers use Ethernet instead.) But if you need to hook up a new Mac to a LocalTalk printer or network and don't want to mess with the internal modem slot, look to Farallon Communications' $110 iPrint Adapter LT. This device carries an Ethernet port that connects to the Mac (or an Ethernet hub) and a serial port for linking to LocalTalk. Farallon also makes a version of this device, the $87 iPrint Adapter SL, that provides an Ethernet-to-serial connection for StyleWriter printers. For more on connecting printers, see the sidebar "Share and Share Alike."

Tricky Business If you've got a Rev. A or B iMac (the original Bondi blue models) and a sense of adventure, you can

Share and Share Alike

ADDING A NEW MAC to your home or office can be a lot of fun, but figuring out how to parcel out your existing peripherals isn't. Should you move the printer to the new system? Buy a monitor for the newcomer? Use an old display and end up with a monitorless Mac? Thankfully, you can share some peripherals among a group of Macs.

Share a Printer Take printers, for example. You may want to share a printer among several computers by connecting it to an Ethernet network. Unless older printers (which usually communicate using LocalTalk) bear an Ethernet connector, placing one of them on an Ethernet network is impossible without some kind of adapter. That's where Ethernet-to-LocalTalk adapters such as Farallon's iPrint Adapter LT or Asanté's AsantéTalk come in.

Making the connection is simple. Just string a standard Cat 5 (category 5) Ethernet cable from an Ethernet hub to one of these adapters and run Ethernet cables from both your new and your old Mac to the hub. With Ethernet selected in the AppleTalk control panel, both Macs recognize the printer. If you're using the printer with just a single Mac, run an Ethernet crossover cable between the Mac and adapter and forgo the hub.

Cat 5 Ethernet cables cost less than $10, and you can set up small hubs for just under $50. Cables and hubs are available from your local computer-supply store.

Share a Vision If you have multiple Macs and are using one for tasks that don't often require visual displays (for example, running a server or burning CDs), you may want to share a monitor between machines. A monitor switchbox and a couple of VGA monitor cables will do the job. Just connect the monitor's hardwired cable to the monitor-out port on the switchbox, and the two VGA monitor cables from the switchbox's two input ports to the video-out ports on both Macs. To switch the monitor from one Mac's video output to the other, simply toggle the A/B switch.

You can buy no-name switchboxes that control peripherals for two Macs from most computer-supply stores for less than $25. When you really need to share the wealth, consider CompuCable's (714/557-5510, www.compucable.com) $120 Power Reach Lite KVM controller, which lets you share one monitor, keyboard, or mouse between up to four Macs.

Communication Facilitation

Company	Product	Mouse Rating	List Price	Contact	Type of Adapter
HOOK UP NEW MACS TO SERIAL PRINTERS, MODEMS, DIGITAL CAMERAS, AND OTHER DEVICES					
Asanté Technologies	AsantéTalk	♦♦♦1/2	$129	888/491-4067, www.asante.com	LocalTalk
Belkin	USB Serial Adapter for Macintosh	♦♦♦1/2	$69	310/604-2263, www.belkin.com	USB-to-serial
CompuCable	Mini-Geo	♦♦♦1/2	$70	714/557-5510, www.compucable.com	USB-to-serial
Farallon Communications	iPrint Adapter LT	♦♦♦♦	$110	510/346-8000, www.farallon.com	LocalTalk
	iPrint Adapter SL	♦♦♦♦	$87	510/346-8000, www.farallon.com	StyleWriter Serial
GeeThree	Stealth Serial Port	♦♦♦♦	$50	650/328-2359, www.geethree.com	Serial for blue-and-white G3
Griffin Technology	gPort	♦♦♦♦	$49	615/255-0990, www.griffintechnology.com	Serial for blue-and-white G3 or for G4
	iPort	♦♦♦1/2	$79	615/255-0990, www.griffintechnology.com	Serial for Rev. A and B iMac
Inside Out	Edgeport 4	♦♦1/2	$399	512/306-0600, www.ionetworks.com	USB-to-serial
Keyspan	SX Pro Serial Card	♦♦♦♦	$179	510/222-0131, www.keyspan.com	PCI-to-serial
	USB Twin Serial Adapter	♦♦♦♦	$79	510/222-0131, www.keyspan.com	USB-to-serial
MegaWolf	Remus/2	♦♦♦	$192	203/562-1243, www.megawolf.com	PCI-to-serial
	Romulus/4	♦♦♦	$269	203/562-1243, www.megawolf.com	PCI-to-serial
	Rufus/8	♦♦♦	$568	203/562-1243, www.megawolf.com	PCI-to-serial
Momentum US	uConnect	♦♦♦1/2	$79	877/381-1400, www.momentumus.com	USB-to-serial
HOOK UP NEW MACS TO ADB INPUT DEVICES					
CompuCable	Mini-ADB	♦♦♦	$33	714/557-5510, www.compucable.com	USB-to-ADB
Griffin Technology	iMate	♦♦♦♦	$39	615/255-0990, www.griffintechnology.com	USB-to-ADB
HOOK UP NEW MACS TO SCSI SCANNERS, PRINTERS, AND STORAGE DEVICES					
Belkin	F5U015-TPW	♦♦♦1/2	$99	310/604-2263, www.belkin.com	USB-to-SCSI
Microtech	USB-SCSI-DB25	♦♦♦1/2	$79	203/483-9402, www.microtechint.com	USB-to-SCSI
	USB-SCSI-DB50	♦♦♦	$79	203/483-9402, www.microtechint.com	USB-to-SCSI
Second Wave	SCUSBee	♦♦♦	$79	214/560-2290, www.2ndwave.com	USB-to-SCSI
Xircom	PortGear SCSI DB-25 Adapter	♦♦♦♦	$80	800/438-4526, www.xircom.com	USB-to-SCSI
HOOK UP NEW MACS TO SEVERAL TYPES OF PERIPHERALS SIMULTANEOUSLY					
CompuCable	GDock	♦♦♦1/2	$219	714/557-5510, www.compucable.com	multipurpose hub for blue-and-white G3 or for G4
	iDock2	♦♦♦	$259	714/557-5510, www.compucable.com	multipurpose hub for Rev. A and B iMac
HOOK UP OLD DESKTOP MACS TO USB DEVICES					
ADS Technologies	USB Port for Desktops	♦♦♦1/2	$40	800/888-5244, www.adstech.com	PCI
Ariston Technologies	iConnect Series 002	♦♦♦1/2	$39	714/846-7676, www.ariston.com	PCI
Belkin	Busport for Mac	♦♦♦1/2	$59	310/604-2263, www.belkin.com	PCI
Global Paragon	PCI to USB	♦♦♦	$39	785/539-9697, www.alchemytech.com	PCI
Inside Out	PCI to USB	♦♦1/2	$99	512/306-0600, www.ionetworks.com	PCI
Keyspan	USB Card	♦♦♦1/2	$39	510/222-0131, www.keyspan.com	PCI
MacAlly	PCI to USB	♦♦♦	$59	626/338-8787, www.macally.com	PCI
Macsense	PCI USB Adapter	♦♦♦	$49	800/642-8860, www.macsense.com	PCI
SIIG	USB DualPort PCI-M	♦♦♦1/2	$49	510/657-8688, www.siig.com	PCI
Xircom	PortGear 2-port USB Upgrade Kit	♦♦♦1/2	$40	800/438-4526, www.xircom.com	PCI
XLR8	DualPort USB PCI	♦♦♦1/2	$44	770/564-5682, www.xlr8.com	PCI
HOOK UP OLD POWERBOOKS TO USB DEVICES					
ADS Technologies	USB Port for Notebooks	♦♦♦	$90	800/888-5244, www.adstech.com	PCMCIA
Ariston Technologies	Cardbus iConnect Series 004	♦♦♦	$99	714/846-7676, www.ariston.com	Cardbus
Belkin	USB Busport Mobile	♦♦♦1/2	$99	310/604-2263, www.belkin.com	PCMCIA
Global Paragon	PCMCIA USB Adapter	♦♦♦1/2	$99	785/539-9697, www.alchemytech.com	PCMCIA
Macally	Cardbus USB	♦♦♦1/2	$99	626/338-8787, www.macally.com	Cardbus

Editors' Choice appears in red.

Comments
Connects to LocalTalk via Ethernet port.
Can only use one port at a time; did not work with ColorWriter 2400 printer.
Two-port serial-to-USB adapter; needs its own powered USB port.
Provides all cables necessary for connecting printers and Macs.
Connects serial-only StyleWriters I, II, 1200, 1500, 2200, 2400, and 2500.
Adds a serial port via the modem slot.
Adds a serial port via the modem slot; easy-to-use software.
Adds a serial port and monitor-out port to Rev. A and B iMacs via the mezzanine slot.
Four-port serial-to-USB adapter; needs its own powered USB port.
Four-port serial card for PCI Mac; easy-to-use software.
Two-port serial-to-USB adapter; easy-to-use software.
Two-port serial card for PCI Mac; easy-to-use software.
Four-port serial card for PCI Mac; easy-to-use software.
Eight-port serial card for PCI Mac; easy-to-use software.
Can only use one port at a time; did not work with ColorWriter 2400 printer.
Comes with two ADB ports, but can use only one at a time. Works without drivers; supports soft power-on via keyboard; drivers needed for dongle functionality.
Connects ADB devices via USB; built-in activity LED. Works without drivers; supports soft power-on via keyboard; drivers needed for certain functionality, such as dongles.
Includes a separate power terminator for connecting SCSI devices via USB; OS 9–ready.
Needs a separate power terminator for some devices; OS 9–ready.
Built-in HD50 connector for connecting Ultra Narrow SCSI devices; OS 9–ready.
Slow file copying; doesn't work with CD burners.
Power termination built in.; updated USB drivers needed for OS 9.
Four-port USB hub, two serial ports, parallel port, and slot for connecting an internal ATAPI device such as a Zip, magneto-optical, or Superdisk drive.
Four-port USB hub, two serial ports, ADB port, and a floppy-disk drive.
Two-port USB card for PCI Mac; includes Apple USB 1.1 drivers and link to upload.
Two-port USB card for PCI Mac; includes Apple USB 1.3.5 drivers.
Two-port USB card for PCI Mac; includes Apple USB 1.1f2 G41 drivers.
Two-port USB card for PCI Mac; no included drivers; no mention of Mac in manual or box.
One-port USB hub.
Two-port USB card for PCI Mac; includes Apple USB 1.1 drivers.
Two-port USB card for PCI Mac; no included drivers.
Two-port USB card for PCI Mac; no included drivers.
Two-port USB card for PCI Mac; includes Apple USB 1.1f2 G49 drivers.
Two-port USB card for PCI Mac.
Two-port USB card for PCI Mac; includes Apple USB 1.1 drivers.
Two-port USB card draws power from PowerBook ADB port; no included drivers.
Two-port USB card draws power from PowerBook ADB port; includes Apple USB 1.2 drivers, which don't work with PC Cards.
Two-port USB card draws power from PC Card socket; no included drivers.
Two-port USB card draws power from PC Card socket; no included drivers; no mention of Mac in manual or box.
Two-port USB card draws power from PC Card socket; no included drivers.

add a serial port with Griffin Technology's $79 iPort. This card fits in a hidden mezzanine slot (discontinued in later models), so you'll have to unscrew the iMac's case to insert the iPort. It adds a single serial port that works with most printers and MIDI devices. The iPort supplies a video-out port as well, and it supports a greater variety of screen resolutions than these iMacs can otherwise offer.

Hooking Up ADB Input Devices to New Macs

New computer technology is often better than old. The round mouse included with modern desktop Macs is a distinct exception to this rule. If you prefer your trusty old ADB input device, check out Griffin Technology's $39 iMate and CompuCable's $33 Mini-ADB adapters. The iMate has two usable ADB ports, so it gets our nod; although the Mini-ADB comes with two ADB ports, you can use only one at a time.

Hooking Up SCSI Devices

There are a few ways to connect new Macs to older SCSI devices, which include external hard drives, scanners, printers, and Zip and Jaz drives. If your Mac has PCI slots and you need speed, consider installing an internal SCSI card (see "Generation Gap," August 1999).

The easier route to SCSI connectivity is a USB adapter, but because USB is much slower than SCSI—topping out at a data-transfer rate of 1.5 MBps, versus the 5-MBps transfer rate you get on most older Macs—SCSI peripherals may seem far less zippy with USB adapters. Just beware: if you fail to purchase the right USB-to-SCSI adapter, zippiness will be the least of your problems. The $80 Xircom PortGear SCSI DB-25 Adapter was the most reliable in our lab tests.

Driver Dilemma Our tests revealed that not all USB-to-SCSI adapters are created equal. To begin with, most had problems with the USB drivers that shipped in OS 8.6 and OS 9. Apple is updating those drivers, and when we used the update betas, the adapters worked far more reliably. Hopefully, the drivers will be out of beta by the time you read this; check Apple's Web site, at http://asu.info.apple.com/swupdates.nsf/artnum/n11543.

Potential Problems Another possible gotcha: Second Wave's $79 SCUSBee won't automatically mount or recognize external disks. You have to rely on a tool such as Apple's Drive Setup—while not difficult, this is certainly inconvenient. Also, the Belkin F5U015-TPW and Microtech USB-SCSI-DB50 adapters require an active terminator—an add-on device that echoes the SCSI signal back to the source—for attached Zip drives to work. Belkin includes an active terminator, but Microtech does not.

Finally, all of these adapters failed to work with our SCSI scanners and printers because of driver incompatibilities. Our old SCSI scanners and printers rely on Classic SCSI Manager, while the adapters we tested require the newer SCSI Manager 4.3. If your scanner or printer supports only Classic SCSI Manager, an internal SCSI card will serve you better—for now, anyway. Keep your eyes open for adapters supposedly in the works that support Classic SCSI Manager.

Port Authority

Don't let the ship leave the dock without you. This handy key is your guide to new and old communication methods on the Mac.

ADB

ADB (Apple Desktop Bus) ports connect low-speed input devices, such as keyboards and mice. ADB appears on older Macs, as well as on the blue-and-white Power Macintosh G3.

Ethernet

Ethernet ports connect Macs to networks. Ethernet is a LAN protocol that replaced LocalTalk on newer Macs. It supports data-transfer rates as fast as 10 Mbps. An Ethernet variation, 100BaseT (or Fast Ethernet), handles data-transfer rates as fast as 100 Mbps.

FireWire

FireWire is Apple's name for the IEEE 1394 bus standard. This relatively recent, speedy standard can handle data-transfer rates as high as 400 Mbps. FireWire peripherals are not as widespread as USB devices.

Serial (DB9)

Serial (mini-DIN 8)

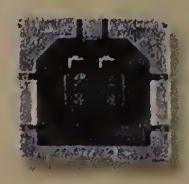
Serial ports connect printers, modems, and digital cameras. Serial ports have 8, 9, or 25 pins and appear only on older Macs. The 8-pin variety shown here is also known as mini-DIN.

Serial (LocalTalk)

LocalTalk ports connect LocalTalk printers at a poky 235 Kbps. The term also describes the LAN (local area network) protocol from Apple. Newer Macs don't have these ports, relying instead on Ethernet.

USB (Type A)

USB (Type B)



USB (Universal Serial Bus) ports replace ADB and serial ports on newer Macs. USB is hot-swappable and can connect your Mac to everything from input devices to printers to digital cameras. Although not as fast as FireWire, USB's data-transfer rate of 12 Mbps still beats ADB and serial. There are two types of USB connectors: the rectangular Type A connectors, which you'll find on modern Macs, and Type B connectors, which appear on USB-compatible devices such as printers, scanners, hubs, and MIDI interfaces.

SCSI-1 SCSI-2

SCSI (small computer system interface) ports connect hard drives, scanners, and printers. SCSI is one of the faster data-transmission methods (up to 80 MBps) and appears only on older Macs. There are many types of SCSI, including SCSI-1, with a 25-pin connector, and SCSI-2, which has a 50-pin connector. Both SCSI-1 and SCSI-2 support multiple peripherals. SCSI-1 and SCSI-2 both handle data rates as fast as 4 MBps. Because of the diversity of the SCSI world, make sure you identify your device's SCSI type before you select an adapter.

PCMCIA/ CardBus

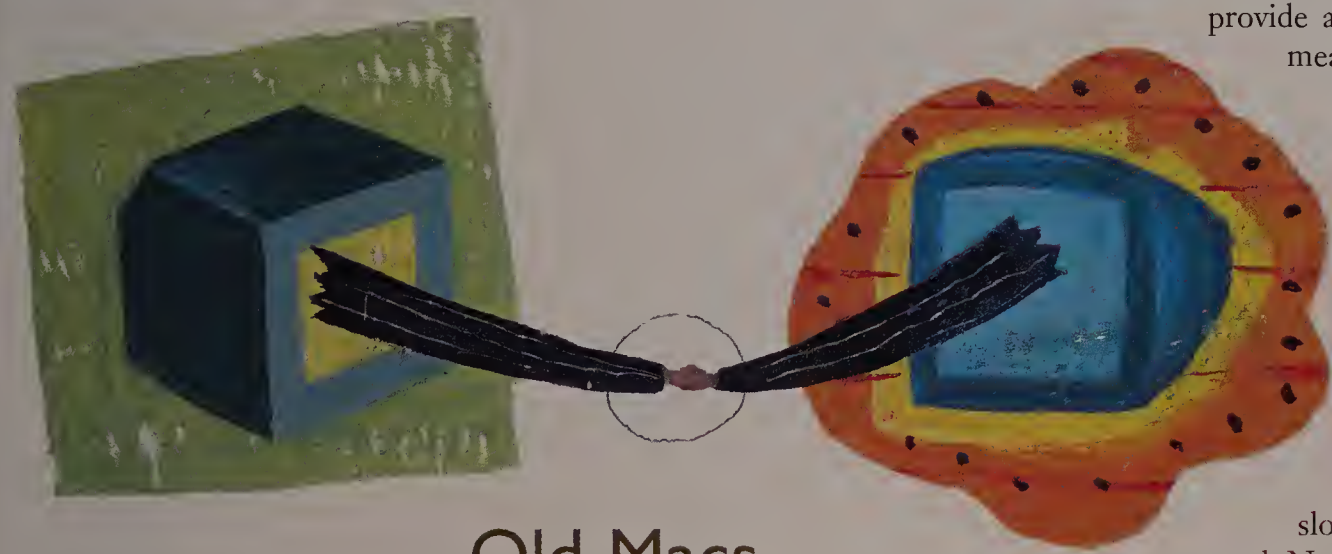
PCMCIA (Personal Computer Memory Card International Association) slots are found on portable computers. Devices that fit in these slots are called PC Cards. There are three types of PC Cards: Type I, Type II, and Type III. CardBus is a variation on the PCMCIA standard that supports a 32-bit bus (wider than the PCMCIA original of 16 bits), and bus mastering and operation speeds up to 33 MHz.

Hooking Up Everything

If you've been using a Mac for a number of years, you may have accumulated a rich assortment of peripherals—a collection so vast that one or two adapters won't connect them all to your new Mac. CompuCable provides two answers: one for iMacs, the other for blue-and-white G3s and Power Mac G4s.

The Hub with a Twist The company's iMac offering, the $259 iDock2, is a swivel-base affair that carries a four-port USB hub, two serial ports, an ADB port, and a floppy-disk drive. The iDock2 lacks a SCSI connection, and it doesn't provide a way to bring video out of your iMac, but it supplies all the other ports you need for older equipment.

A Tight Fit The $219 GDock fits neatly atop a blue-and-white G3 or a Power Mac G4 and boasts a four-port USB hub, two serial ports, a parallel port (useful if you have a parallel PC printer), and a slot for mounting an internal ATAPI device such as a Zip, magneto-optical, or SuperDisk drive. It's handy, but some Power Mac G4 owners will mourn the lack of an ADB port.



Old Macs, New Devices

YOU WANT TO HANG ON TO YOUR OLDER MAC for a while. Maybe it works just fine, maybe you can't afford a new model. Whatever your situation, you don't think you have to connect to new USB devices. But eventually your old ADB keyboard, mouse, or joystick will shuffle off this mortal coil. Or perhaps your serial or SCSI scanner or printer just doesn't cut it anymore. When that time comes, USB cards let your Mac talk to the new kids on the block.

Hooking Up Old Desktops to Everything USB

Adding USB to an older desktop Mac requires a free PCI slot. To see whether your Mac has a PCI slot, go to www.newertech.com and download the Guru 2.8 application.

Drive That PCI Card We evaluated 11 PCI cards that carry USB ports. Most but not all of these cards ship with USB drivers—necessary for your Mac to recognize USB devices. Some cards didn't perform properly because they shipped with outdated drivers. Installing the current USB drivers corrected these problems. As we go to press, the USB Card Support 1.3.5 drivers are most current. You can find them at http://asu.info.apple.com/swupdates.nsf/artnum/n11543. ADS Technologies' USB Port for Desktops got our vote because of the ease with which you can download new drivers for it.

Odd Cards Out Most of these cards are nearly identical, so you can choose one based on price. The exceptions: Inside Out's $99 PCI to USB card carried one port rather than the other cards' two. There are also PCI cards that combine USB and FireWire connectivity. In addition to two USB ports, you'll find two FireWire ports on the $159 Orange Micro (714/779-2772, www.orangemicro.com) Orangelink FireWire/USB PCI Board and three FireWire ports on the $179 Ratoc (408/955-9400, www.ratocsystems.com) PCIFU1P card.

PCI Performance Hit With all of these cards, once we installed the USB Card Support drivers, we noticed a decrease in performance. Overall processor speed dropped between 5 and 10 percent. However, by the time you read this article, Apple will most likely have released new drivers that fix the problem.

Future Looks Rosy In the near future, you should see USB adapters that not only carry more than two USB ports but also provide a separate bus for each port—meaning you can run up to 127 USB devices on each port, rather than sharing the 127 among various ports, as you must do when using the above crop of cards.

Hooking Up Old PowerBooks to Everything USB

You can add USB to your PowerBook via the PC Card slots on the side of your portable pal. None of the USB cards we evaluated shipped with the current USB Card Support drivers; you'll have to download them from http://asu.info.apple.com/swupdates.nsf/artnum/n11543.

Power Source Two of the five cards we examined—Ariston's $99 Cardbus iConnect Series 004 and ADS's $90 USB Port for Notebooks—require that the cards draw power from the PowerBook's ADB port. Although they provide a pass-through ADB connector, a cable dangling from the ADB port to the card is hardly elegant. The other three cards pull power from the PC Card socket and are comparable in price and performance. Any one of the following should do the job: the $99 Cardbus USB, from Macally; the $99 USB Busport Mobile, from Belkin; and the $99 PCMCIA USB Adapter, from Global Paragon.

The Last Word

Apple's efforts to drag computing—and its users—into the 21st century has left many of us feeling like lost souls in an alien world. But thanks to these many adapters, converters, and cards, the foreign can start to feel more familiar. Now that you know the lay of the land, you too can walk the road between the old and the new Mac worlds. m

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Contributing Editor CHRISTOPHER BREEN is a coauthor of *My iMac* (IDG Books Worldwide, 1999).

Macworld LAB TEST

GET THE MOST OUT OF APPLE'S WIRELESS AIRPORT TECHNOLOGY WITH THESE HANDS-ON TIPS

CUT LOOSE

by Christopher Breen

APPLE HAS PULLED ANOTHER FAST ONE. HOW ELSE CAN YOU DESCRIBE the company's ability to successfully market an otherworldly gray pod, a thin silver card, and the promise of communicating through thin air—without stressing the word *networking?* Rather than frightening Mac users by mentioning brain-numbing terms such as *TCP/IP* and *DHCP*, Apple is spinning dreams of an unplugged world. In this utopia, iBook users effortlessly join communities of other mobile Macs by simply opening the lids of their colorful cordless companions. How? With Apple's new wireless technology, AirPort.

The good news is, Apple's aspirations are not far-fetched. As of now, new Macs are AirPort-ready—all you need to get started is a $99 AirPort card (800/692-7753, www.apple.com) and possibly a $299 AirPort Base Station. (Don't have a new Mac? See the sidebar, "AirPort Alternatives.") Today you can walk into a classroom, flip open an iBook, and—without benefit of wires—send a message telling your best friend to meet you after school. You can run a cable from your PowerBook's audio-out port into your home stereo and stream MP3 files from the computer upstairs. You can connect all your ancient Macs to a single AirPort Base Station via an Ethernet hub and share a single Internet connection. Be aware, however, that you'll see a drop in data-transfer speed (see the benchmark, "Slower Than Wires.")

All these things are possible with AirPort, but they require more effort and know-how than you might think. Managing many of these feats requires digging down into a few control panels and mucking about with arcane settings. That's where *Macworld* comes in. Whether you're new to wireless networking or a seasoned professional, the following AirPort tips are sure to make your unplugged experience a more pleasant and productive one.

Photography by Mark Johann

Getting Set Up

In a perfect world, all you'd need to do is spend the cash for an AirPort-ready Mac, an AirPort card, and an AirPort Base Station, and your network would be ready to fly. But AirPort is more than just hardware. Like any network—wireless or not—it requires a bit of tweaking. These configuration tips will help get your AirPort network off the ground.

Upgrade Your Software Shortly before we went to press, Apple released version 1.1 of the AirPort software. If you want the best AirPort has to offer, you *must* install this free update on your Mac (go to http://asu.info.apple.com/swupdates.nsf/artnum/n11570 to download the newest version).

This update fixes a slew of bugs—for one, it lets a "sleeping" Mac easily log back onto an AirPort network. Version 1.1 also provides new capabilities, including *active roaming*—a feature for grouping multiple AirPort Base Stations into a huge wireless network. It's now easier to reset the Base Station's password. Just press the reset button for a second to reset the Base Station, as well as network passwords and the unit's IP address.

Configure Your AirPort from Any Mac In its first iteration, the AirPort software allowed you to configure an AirPort Base Station only from an AirPort-bearing Mac, such as an iBook. Thanks to the 1.1 update, this is no longer the case. The AirPort Admin Utility—included with the AirPort 1.1 update—lets you configure an AirPort Base Station from a Mac that's not equipped with an AirPort card.

You'll find the AirPort Admin Utility in the Base Station Extras folder of the AirPort folder that's created when you launch the AirPort 1.1 image file. Drag the AirPort Admin Utility folder to your hard drive and read through the Installation Instructions document—you need to take some not-so-obvious steps to use this utility on a non-AirPort Mac. If you aren't using a third-party wireless card to communicate with the Base Station, you'll need a Mac with an Ethernet port and either an Ethernet crossover cable or an Ethernet hub and two standard Ethernet cables.

Join an Existing Network You can, of course, attach an AirPort Base Station to an existing Ethernet network by connecting an Ethernet cable from a single Mac or Ethernet hub to the Base Station. But how do you configure the Macs on the Ethernet network to communicate with the Base Station? Open the TCP/IP control panel on the Mac attached to the Ethernet network. Press ⌘-K to open the Configurations window, and then click on the Duplicate button to copy the existing configuration. Name the duplicate; click on Make Active; and in the resulting window, choose Ethernet Built-In in the Connect Via pull-down menu and Using DHCP Server in the Configure menu. Close this window and click on Save when prompted. You've now configured that particular Mac to access the AirPort network and to use the Base Station's modem.

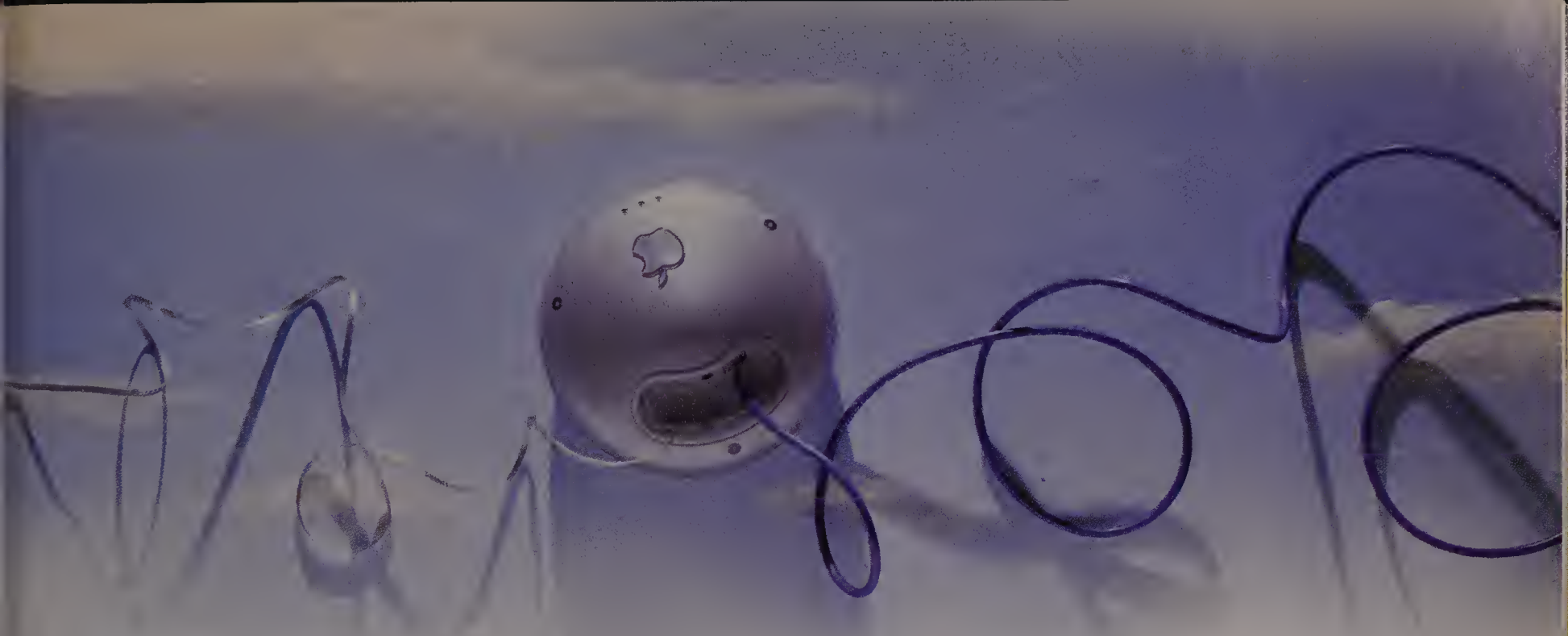
Let Your Fingers Do the Typing The AirPort Setup Assistant, the utility that helps you configure your remote network and dial-in settings, grabs settings from the Remote Access and TCP/IP control panels—if you've previously configured them. However, these aren't the only settings you might want the Assistant to pay attention to. If you've configured the DialAssist control panel so that a 9 precedes any number dialed out from your Mac, the AirPort Setup Assistant won't transfer that setting to the AirPort Base Station for you. Instead, you must *manually* add this prefix setting to the numbers your AirPort Base Station dials.

AIRPORT ALTERNATIVES

With the release of the latest PowerBooks (see "Inner Beauty," May 2000), Apple offers wireless networking technology in all its new computers. While this is unquestionably giddy news for those who have recently purchased—or are planning to purchase—a new Mac, it tends to create a gap between the AirPort-ready haves and the have-nots. Integrating the AirPort Base Station into any Ethernet network is easy, so owners of deskbound Macs need not worry, but what about those with earlier PowerBook models?

Thanks to PC Cards that support the IEEE 802.11 standard (the wireless standard AirPort uses), owners of the PowerBook 190, 1400, 2400, 3400, or 5300 or any PowerBook G3 model can connect to AirPort-equipped Macs—wirelessly. PowerBook users currently have a couple of choices in PC Cards, including Farallon's SkyLine Wireless PC Card and Lucent Technologies' Orinoco PC Card Silver.

Slow SkyLine As we go to press, Farallon offers a 2Mbit version of its SkyLine card for $249. Compared with the Orinoco Silver card—priced at $179—the SkyLine is no bargain for a couple of reasons. To begin with, in our lab tests, the SkyLine was less than half as fast as the Orinoco Silver. In addition, the SkyLine works only if you've turned the AirPort Base Station's encryption option off. (Lucent's cards required that you turn off encryption under the AirPort 1.0 software, but this is not necessary with the AirPort 1.1 software.) Finally, configuring the



Avoiding Idiosyncrasies

Ever notice that your AirPort connection disappears when you place your iBook on top of a running microwave? Are you getting connection errors whenever you try to log onto the Internet from your AirPort network? There's a reason: AirPort's still a bit quirky.

AirPort and AOL AirPort's instructions clearly state that AirPort dial-up connections will not work with America Online (AOL uses a special connection method that isn't compatible with AirPort). However, many people forget that you can log onto AOL via TCP/IP if you have another Internet connection. If your AirPort-equipped Mac can get to the Internet via another ISP, you have access to AOL as well.

To configure AOL 4.0 for a TCP/IP connection, click on the Setup button in AOL's opening screen and then select the last option—Set Up AOL To Sign On From A New Location—and click on the Next button. Name the location in the next window—TCP Connect, for example—and click on Next. In the Add Connections window, select the Add A TCP Connection option and click on Next to add TCP access. When you dial up your ISP, you'll be able to log onto AOL as well.

Try, Try Again It takes the AirPort Base Station longer than a regular modem to complete a dial-up call—longer than some applications might care to wait. More often than not, when you initiate a Web connection from your e-mail client or Web browser, you'll eventually receive an error message stating that a connection could not be completed. This occurs because the Base Station fails to complete the call in the time that application allots. When you see this error, acknowledge it by clicking on OK or closing the error-message window, and try your request again. In all likelihood, the Base Station has logged on

SkyLine card to work with a Mac can be confusing.

For the card to coexist with AirPort, you must first double-click on the card's icon on your desktop. In the resulting dialog box, select Infrastructure in the Network Mode pull-down menu and Translation-Apple/Lucent in the Address Mode pull-down menu. If you have a single access point—an AirPort Base Station, for example—enter an asterisk (*) in the SSID field.

Thankfully, by the time you read this, Farallon should be offering an 11Mbit version of the SkyLine that will more closely match the performance of the Orinoco Silver card with encryption activated and will be easier to configure. Farallon was unwilling to commit to a price at press time, but a marketing representative stated that the company intended the price to be competitive. Farallon will offer the 11Mbit card at a reduced price to those who have already purchased the 2Mbit SkyLine card.

Orinoco Quirks The Orinoco card is not without its vagaries as well. Unless you want your Orinoco card to reside permanently in your PowerBook, you should be aware that you can't eject the card by simply dragging its icon to the Trash. In order to remove the card, you must select a different networking protocol in the AppleTalk and TCP/IP control panels—changing these from AirPort to Ethernet, for example. With these control panels changed, you can drag the card's icon to the Trash, and the card will pop out as it should. The SkyLine 2Mbit card we tested ejects without requiring changes to control-panel settings.

Macworld's Buying Advice The Orinoco PC Card Silver is a fine solution for users with older PowerBooks who want to take advantage of AirPort. Regrettably, Farallon's current SkyLine card is too slow and too expensive to earn our recommendation.

Orinoco PC Card Silver

RATING: ♦♦♦♦ **PROS:** Compatible with older PowerBooks; compatible with AirPort software and encryption. **CONS:** Difficult to eject. **COMPANY:** Lucent Technologies (800/928-3526, www.wavelan.com). **COMPANY'S ESTIMATED PRICE:** $179.

SkyLine Wireless PC Card

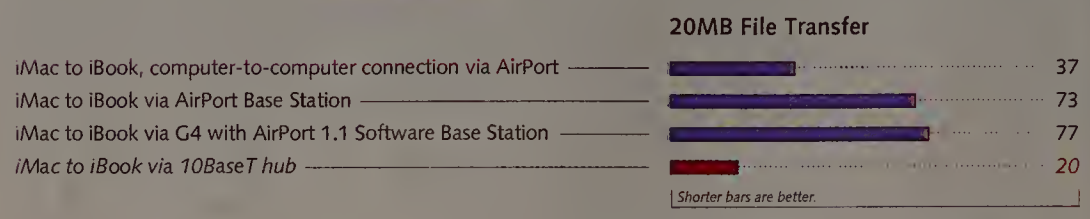
RATING: ♦♦½ **PROS:** Compatible with older PowerBooks. **CONS:** Slow; expensive. **COMPANY:** Farallon (800/613-4954, www.farallon.com). **COMPANY'S ESTIMATED PRICE:** $249.

Macworld LAB TEST

Slower Than Wires

Sadly, there's a price to pay for freedom: AirPort speeds are still far below those of traditional Ethernet networking via cables. But when you're working without wires, how you use your AirPort determines how much more slowly those Web pages download. Our tests reveal that you'll get the best wireless performance if you stick to computer-to-computer transfers with AirPort. Using a Base Station will slow you down, although there's not much difference in speed between AirPort 1.1 Software Base Station and the spaceshiplike AirPort Base Station.

Best results in red. *Reference system in italics.* All results are in seconds.



Behind Our Tests We transferred a 20MB Adobe Photoshop file via AirPort using an iMac DV Special Edition, an iBook, and a Power Macintosh G4/400 running AirPort 1.1 Software Base Station. Encryption was turned off for our Base Station tests. Systems ran Mac OS 9 with file sharing over TCP/IP enabled.—**Macworld Lab testing supervised by Gil Loyola**

in the meantime and the application will work as expected.

Get Disconnected Unlike a standard modem, the AirPort Base Station (or AirPort Software Base Station) can't automatically log on to the Internet and then log off when it completes a task. Instead, you must either manually disconnect the Base Station by clicking on the Disconnect button in the Status portion of the AirPort application or wait for the Base Station to disconnect after a period of Internet inactivity.

If you'd prefer that your Base Station not stay connected to the Net twiddling its virtual thumbs, decrease the amount of time it spends online by shortening the idle-time interval. To do so, launch the AirPort Admin Utility, click on the Internet tab, and choose a shorter time—two minutes, for example—in the Disconnect If Idle pull-down menu.

Stay Up-to-Date Security-conscious Mac users routinely change their ISP log-on password. When you change passwords, you undoubtedly update your e-mail client and perhaps the password setting in the Internet control panel. But if you use an AirPort Base Station, don't forget that you must also update the password stored inside it.

To update the Base Station password, launch the AirPort Admin Utility and select the Base Station you wish to update. Next, click on Configure, then on the Internet tab, and then on the Change Password button. Enter and confirm your new password. Finally, click on the Update button at the bottom of the Configure AirPort Base Station window, and wait while the Base Station updates and resets.

Don't Crash Any Airplanes Apple tells us it's inadvisable to operate an AirPort card while inside an airplane—doing so can interfere with the avionics of the aircraft. This would be a bad thing. For all our sakes, if your iBook has an AirPort card installed, please switch off the card before you fly.

Run Interference When AirPort-equipped Macs and AirPort Base Stations are in close proximity, very little can interfere with the signal between them. However, once they are a room or two apart, certain appliances can degrade or completely impede performance. These electronic doodads include refrigerators, microwave ovens, and—because AirPort uses similar frequencies—2.4GHz cordless phones. If you notice a dramatic decrease in signal strength with an appliance nearby, consider moving your Mac or Base Station—it may take only a couple of feet for the signal to improve.

Fun for the Whole Family

AirPort is not only great for classrooms and small offices, but also a handy—and possibly entertaining—tool around the house.

Rig Up a Remote Jukebox Tunes never sound as good on small computer speakers as on your home stereo speakers. Wouldn't it be great if you could play your MP3 files on your home stereo without storing those files on your iBook's low-capacity hard drive? With AirPort, another Mac attached to your AirPort network, an MP3 encoder and player, your home stereo, and one cable, you can. Here's how.

Encode and store a few audio CDs as MP3 files on the Mac that will act as your MP3 server, and save the playlist. On the iBook, use the Chooser or Network Browser to mount the hard drive where these encoded files reside, and then copy the playlist (not the encoded files) to the iBook's hard drive. You'll need an audio Y cable that carries a Walkman-style stereo miniplug on one end and two mono RCA plugs on the other. Attach the miniplug to the iBook's audio-out port and the RCA plugs to the auxiliary input on your home stereo's amplifier.

Launch a copy of your MP3 player—Casady & Greene's $50 SoundJam MP (831/484-9228, www.casadyg.com) or Panic's $18 Audion (503/296-2185, www.panic.com), for example—on the iBook, and open the playlist you copied from the other Mac. Click on the play button and listen in amazement as the MP3 files contained on the server beam to your iBook and begin playing through your home stereo.

Send a Wireless Message Want to make a wireless date with that special someone in your trigonometry class? For this trick to work, you must configure the remote Mac so that your Mac's hard drive appears on its desktop.

Open the File Sharing control panel on your Mac, click on the Activity Monitor tab, and option–double-click on any name that appears in the Connected Users field. In the window that subsequently appears, type a message—comprising as many as 199 characters—to that user. When you're ready to send, click on OK—your message will appear on the remote Mac.

The Last Word

Now that you have these tips and techniques under your belt, freedom from wires is in sight. To further increase your AirPort knowledge, check your Mac's Help menu for additional materials. You and your Macs are ready for the airwaves. m

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Just to prove that it works, Contributing Editor CHRISTOPHER BREEN has an AirPort-based MP3 streaming server in his home. Next time you're within 150 feet of his house, feel free to tune in.

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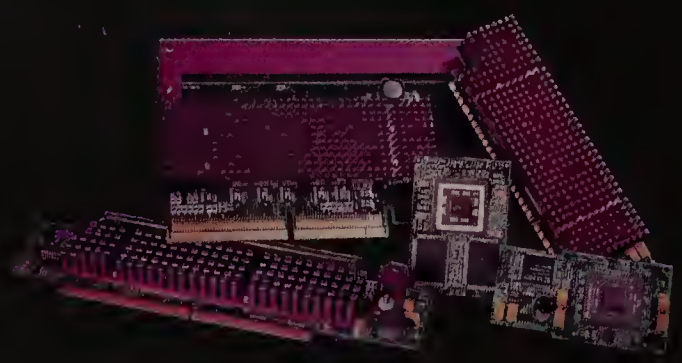

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Secrets

The Mac for Many

SECRETS FOR MAINTAINING THE MULTIPLE-USER MAC

by Joseph Schorr

The Macintosh has always been a computer with a personality—but ever since the arrival of Mac OS 9, it's had 39 more. Personalities, that is. With OS 9's Multiple Users feature, you can create as many as 40 different user accounts on your Mac. Though the various users share one machine, they have their own access rights and can—to a degree—customize their systems with their own preferences and style (see the sidebar "Multiple-User Mysteries"). Here's a quick overview of the Multiple Users feature and power-user tips.

MARK GAGNON

The Basics

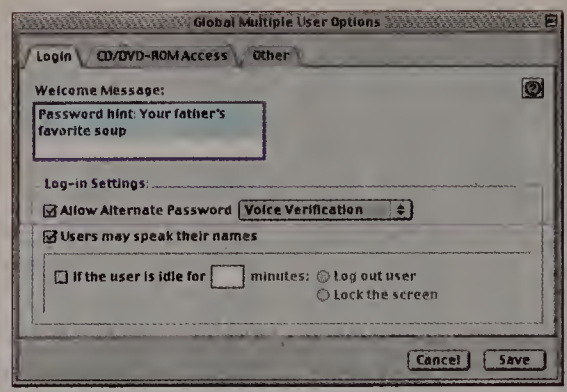
As the *owner* of your Mac, you can configure your machine for each user through the Multiple Users control panel. Each user you designate can be assigned one of three different working *environments*. The *Panels* environment—primarily geared toward children—is a simple, button-driven interface similar to Apple's At Ease. Only the items designated by the owner appear in the Panels windows. *Limited* users can see all the items visible in the Finder but can open and use only those to which you give them access. The *Normal* user environment provides full Mac access, but it hides the contents of document folders owned by other user accounts.

Expert Tips

It's easy to get started with Multiple Users, but here are some tips that will help you use this control panel like a pro:

- You don't have to shut down or restart to switch between user accounts. Just use the Logout command in the Finder's Special menu (⌘-Q). This is also the easiest way to tell if Multiple User mode is enabled—just check to see if there's a Logout command in the Finder's Special menu.
- Creating a custom welcome message for your Mac used to require either a ResEdit hack or the creation of a custom start-up screen. With Multiple User mode, you can now create your own message, which will appear on the welcome screen that prompts users to log on. This short message (about 60 characters) can be more than a greeting. Use this space to include instructions for logging on or to provide a couple of password hints (see "Need a Hint?").
- The easiest way to find out who is logged on to a Mac is to launch the Apple System Profiler from the Apple menu. Near the top of the System Profile report, you'll see the version of Multiple Users software that's run-

continues



Need a Hint? You can create a customized welcome message for the Multiple Users Login screen. In the Multiple Users control panel, click on the Options button to add your message, which can include password hints or other instructions.

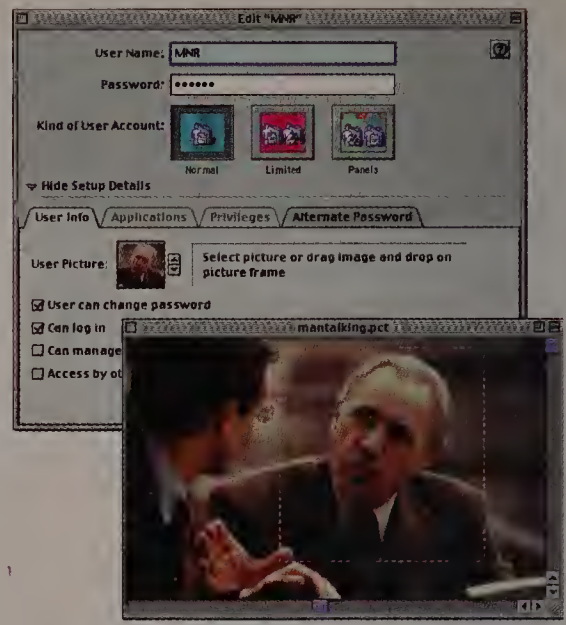
ning, along with the current environment and the name of the user who is logged in.

- You can have users log in by speaking a password, but only if you activate the Allow Alternate Password option in the Multiple Users control panel (click on the Options button to find it). Once you've turned the alternate-passwords feature on, you'll have to open the Alternate Password panel when you edit each user's profile and have each user record a password voiceprint. Voiceprint recognition can be pretty flaky, though. As a rule, longer voiceprints—five or more words—tend to work more reliably than shorter ones. (For tips on setting up Voiceprint, see "Voice-Protect Your Mac," *Secrets*, May 2000.)

Adding a Mug Shot

You probably already know that Multiple Users lets you assign a different picture icon to each user account on your Mac. These icons appear in the Login window, next to each account name. You can also add your own custom icons for each user—the face of the user or some other favorite image—but there are a few tricks to doing this easily and making the icons look good.

- You can drag and drop a picture into the User Picture box to install a custom picture from the Finder, as long as it's the right type of file: a picture-clipping file or an image from the Scrapbook.
- To turn just part of an image into a custom user picture, you can open the image in SimpleText, make a selection by dragging across a portion of the image, and then drag only the selection directly into the User Picture box in the Multiple Users window (see "Face-lift").
- You can drag in a JPEG or GIF image from a Web browser.
- Make sure your pictures maintain the same aspect ratio—48 by 48 pixels—as the User Picture icons. In other words, make sure they're square, not rectangular. Don't worry if your selected picture is a little too big; the Mac automatically scales down larger pictures. But non-square images will end up with clipped edges or ugly white space on the sides. And make sure that your pictures are at least 48 by 48 pixels; smaller images will automatically be scaled up in size, resulting in fuzzy or distorted images.



Face-lift To turn just part of a picture into a custom icon, drag a square-shaped selection from an image opened in SimpleText right into the User Picture box in the Multiple Users control panel.

The No-Touch Zone

If the users of your Mac ever have to make changes in network configuration, you may not want to use the Multiple Users feature. The control panels that handle network settings are inaccessible to anyone other than the owner. The off-limits items include the Multiple Users, AppleTalk, TCP/IP, Remote Access, and File Sharing control panels.

This is because Apple assumes that even though multiple users may be on one Mac, they'll all need to access the same network, use the same TCP/IP protocol, dial the same ISP, and so on. Obviously, this isn't necessarily true. Even if you set up a user with Normal privileges—essentially giving that user full access to the files on that machine—and you give that user the right to manage other accounts (an option in the Setup Details section of the control panel), that person still cannot manage these network-access features. For that the owner is required.

If you want to be able to switch settings, such as network configurations and dial-up numbers, without having to manually make changes in control panel after control panel, there is a way to do it: forget about Multiple Users, and use the Location Manager, which lets you save groups of these settings (see "Tap Into the Location Manager," *Secrets*, May 1999). m

JOSEPH SCHORR is a coauthor of *Macworld Mac Secrets*, fifth edition (IDG Books Worldwide, 1998).

Multiple-User Mysteries

WITH MAC OS 9'S MULTIPLE USERS FEATURE, MUCH OF THE APPEARANCE AND behavior of the whole Mac OS can be tailored to the preferences of each user. The catch is that some Finder preferences, such as spring-loaded folders, can be varied from user to user, whereas others—the names and colors of your Labels, for example—are global settings that all users must share. Here's a quick guide to which features you can tailor to each user and which have to be shared by all—like it or not.

Global Features (shared by all users)	Customizable Features (can be unique to each user)
order of fields in list views	spring-loaded folders
Label names and colors	grid spacing
location of icons on desktop and in folders	Simple Finder option
Scrapbook	View options
AppleTalk	Appearance control-panel features
TCP/IP	sound levels
Remote Access	Stickies
File Sharing	Favorites
Control Strip configuration	Control Strip visibility
	start-up and shutdown items
	Launcher items

Secrets

Tips, Tricks, and Shortcuts

by Lon Poole

Some Web pages take ages to print from Netscape Communicator 4.7 and earlier, and they may not print at all if you surf to another page before the dialog box that reports the progress of printing or print spooling has appeared. Gabriel Dorado of Cordoba, Spain, found a way to print much more quickly. Immediately after clicking the Print button in the Print dialog box, take Netscape offline by clicking the small plug icon in the lower left corner of the browser window. On some Web sites, Netscape may display an alert complaining about being offline, but you can simply click OK and ignore it. After printing or print spooling finishes, click the plug icon to go back online.

Archiving E-mail

Q. I would like to know how I can save e-mail messages from Microsoft Outlook Express 5.0 before deleting them from folders such as Sent and Read.

SERGIO AVENDANO
Long Beach, California

A. The Macintosh E-mail Resource Page (www.macemail.com/archive/pages/archive_oe.shtml) offers several utilities and AppleScripts that archive e-mail from Outlook Express and other programs. For example, Outlook Email Archive ($10 shareware by Stefano Cappello) saves each archived message as a text file in its own folder and organizes message folders by time and date. You can index and search the archived messages, using Sherlock, and read them one at a time, using SimpleText or another program capable of opening a text file.

This approach to archiving is simple and works well if you're dealing with a relatively small number of messages. If you archive hundreds or thousands of messages, however, you'll find that under Mac OS 9 and earlier, files and folders make an inefficient database system, even with Sherlock's help.

Another solution, the free eMessage Keeper, by John Carlsen, archives messages from Outlook Express, Claris Emailer, and Eudora to an elaborate HyperCard stack. Once you get comfortable with the crowded interface, you can browse, search, and sort archived messages quite efficiently. At this writing, this program didn't handle empty folders gracefully.

You can also archive messages from Outlook Express or Claris Emailer to a free FileMaker Pro database, Emailer Archive, created by Dan Crevier and David Cortright. You do this with a free set of AppleScripts, Emailer Archive 3.1b2 Scripts, by Dan Crevier. However, this version of the scripts was designed for Outlook Express 4 and does not archive some of the information about each message that's available in Outlook Express 5.0, such as the date and time received.

None of these solutions keeps track of all the information your e-mail program stores for each message. They all record the subject, date, from, to, and content, and some report the status (such as read or untouched), message history, and flag. None of them records the message color you can assign in Outlook Express. The HyperCard stack and FileMaker Pro solutions keep track of each message's folder but not the folder's place in the hierarchy of folders you can set up in the e-mail program. In fact, if you have two or more folders with the same name but at different locations in your e-mail program, they'll be archived together.

Compacting E-mail Files

Q. The file in which Outlook Express 5 stores all my messages is huge—over 50MB—probably because I once imported all my messages from another e-mail program and then deleted many unwanted messages. Since new messages are added to this file daily, I end up backing up the entire file repeatedly, which is a waste of space and time. Is there any way to reclaim the unused space in this file? (Eudora and Communicator both have this capability.)

M. MORGAN CONN
Amherst, Massachusetts

A. You can compact the mail and database files to reclaim space that was occupied by deleted mail. To do this, quit Outlook Express and then hold down the option key while opening it again. A dialog box asks whether you'd like to compact the database. Click Yes, and a

continues

progress indicator tracks the process. (If you click No, another dialog box asks whether you'd like to do a complex rebuild of the database.) This process renames your original database and message files by appending *.old* to their names, and you can put them in the Trash when you're satisfied that the compacted files work OK.

People who still use Claris Emailer 2.X can follow the same procedure.

Mac to TDD

Q. Is there Mac software that will let me connect via telephone and modem with my deaf aunt's Telecommunications Device for the Deaf (TDD)?

JIM BRADLEY
Westmoreland, Kansas

A. You may be able to connect by accounting for the differences between your modem and the TDD. TDDs, also known as TTYs (Teletypewriters), send and receive text by using a code known as Baudot, whereas your communications software and modem send and receive text by using a different code, ASCII. Some newer TDDs are able to use ASCII, but they communicate at a speed of 300 bps, which is slower than some of today's modems are capable of operating. If your aunt's TDD can use ASCII, you can try using a communications program set to 300 bps, 8 bits data, no parity, and 1 stop bit. In an AppleWorks 5 communications document, for example, you'd adjust the settings in the dialog box that appears when you choose Settings: Communication.

If these settings don't work, you can experiment with different parity and stop-bit settings. It would probably be more efficient in the long run—and a lot easier—to introduce your aunt to e-mail, instant messages, and chat.

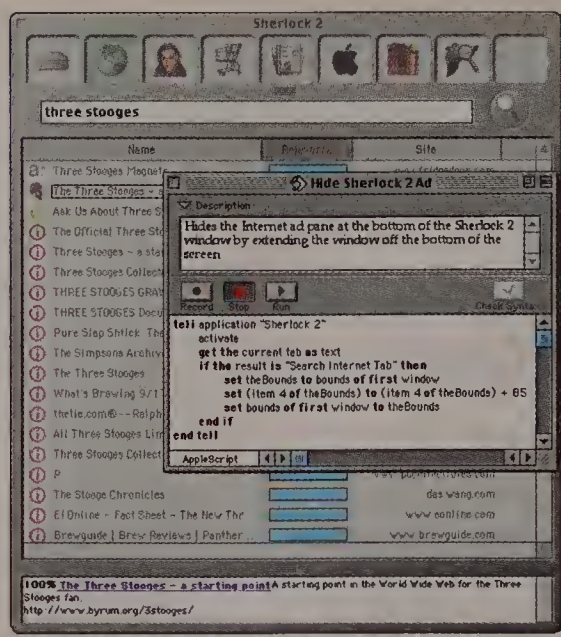
Diagnostic Recomposition in PageMaker

TIP After placing and updating some independent graphics in a 12-page Adobe PageMaker 6.5 document, I found that any attempt to print the document or use the Links command resulted in a "Bad record index" error message. Eventually I learned that this type of error can often be fixed by a diagnostic recomposition, which checks for and repairs some inconsistencies in internal document structure.

Before starting this procedure, make sure your computer's sound is turned on, so you can hear the number of beeps that indicate the procedure's results. Now make a copy of the document, open it, and click the pointer tool in the toolbox to make sure nothing on the page is selected. Begin the dynamic recomposition by holding down the shift and option keys while choosing Type: Hyphenation. When the routines are finished, your computer will beep. One beep means that PageMaker found no repairs to make, two beeps mean that PageMaker successfully repaired the problems it found, and three beeps mean that PageMaker could not repair the problems it found or ran out of memory before completing its diagnostics.

GARY A. HORTON
Reno, Nevada

During diagnostic recomposition, PageMaker fixes minor errors in style sheets, stories, the index, and links and then recomputes line breaks throughout the publication. For details, see document 311417 in the Adobe Support Database (www.adobe.com/support/techdocs/42f2.htm). For workarounds to minor problems that can occur during diagnostic recomposition in PageMaker 6.0, but not 6.0.1 and later, see article 314579 (www.adobe.com/support/techdocs/8e2e.htm).—L.P.



Banish the Banners These AppleScript commands enlarge the Sherlock 2 window sufficiently to move the bottom pane, which displays banner ads during an Internet search, out of view. Enter these commands in a Script Editor window, and when you save them, set the Format option to Classic Applet and turn on the Never Show Startup Screen option. Put the saved applet in the Apple menu or another handy place.

Hiding Ads in Sherlock 2

TIP The workarounds I've tried for hiding banner ads in Sherlock don't work with Mac OS 9's Sherlock 2. So here's what I recommend: expand the size of the Sherlock 2 window to be so tall that the ad pane is off the bottom of the screen. You can do this because Sherlock 2 is one of the applications that lets you slide its window up under the menu bar, then enlarge the window by dragging its lower right corner down, and finally slide the window down. If you size the window just right, Sherlock 2 uses the entire screen height but the ads are hidden below the bottom of the screen.

PATRICK MCCLURE
Santa Monica, California

You can make this maneuver quickly and precisely with the AppleScript applet shown in "Banish the Banners."—L.P.

Rounding to Two Significant Digits

TIP You can convert numbers to two significant digits in a Microsoft Excel worksheet or AppleWorks spreadsheet with a formula such as this:

=round(A1,(*n*-1)-int(log(A1)))

In this formula, the number to convert is in cell A1, and in place of *n* you must enter the number of significant digits. For example, with *n* replaced by 2, the formula would convert 12,423.52 to 12,000.00, 327 to 330, and 2.3587 to 2.40.

JUAN C. QUEVEDO
Miami, Florida

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. He is a coauthor, with John Rizzo, of The *Little Network Book* (Peachpit Press, 1999).

All shareware and freeware mentioned in *Quick Tips* is available from the Macworld Online software library (www.macdownload.com).

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Extend Your Efficiency in QuarkXPress

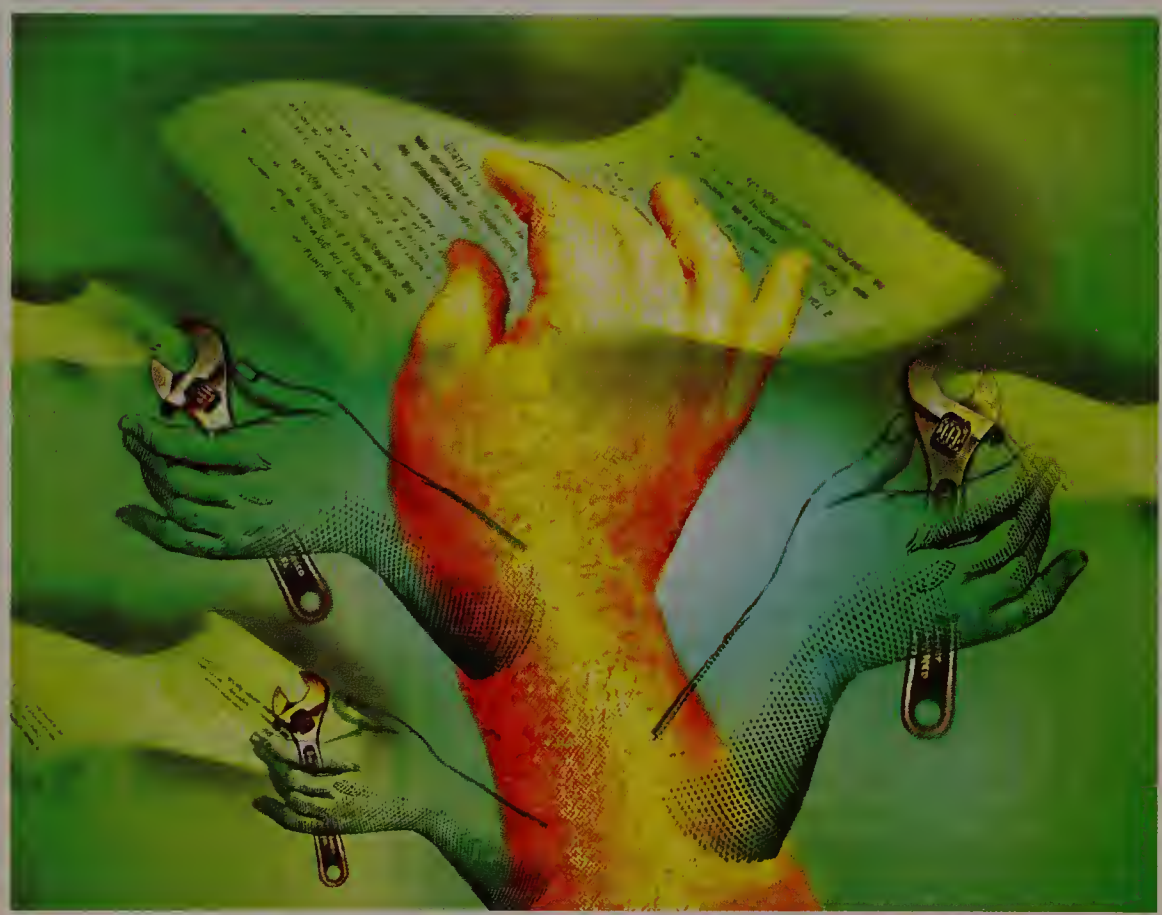
GREAT XTENSIONS MAKE XPRESS REALLY FLY

by David Blatner

EVERY USER OF QUARKXPRESS should own and put to work at least one XTension beyond those that come with the program. I haven't got a particular one in mind—it's up to you to choose from the more than 350 commercial, freeware, and shareware XTensions available. But if you aren't using any, I know for sure you're not as efficient as you could be.

XTensions add functionality to QuarkXPress. Some are free and do relatively simple tasks—such as Markzware's BoldSpot XT (800/300-3532, www.markzware.com), which makes your spot colors' names appear in boldface in the Colors palette. (See "Extend QuarkXPress," *Create*, April 1999, for a list of many other freeware and shareware XTensions.) Others, for a small cost, perform tasks almost any XPress user will find valuable. The Redefine Style Sheet XTension, from Xpedient ($50 after 25 free uses; 781/647-1050, www.xpedient.com), for one, lets you update your style sheets by changing formatting on the page instead of in a dialog box.

Then there are the expensive XTensions that cost hundreds or thousands of dollars. These ultrapowerful tools, such as AutoPage, from KyTek ($945; 603/529-2512, www.kytek.com), are for vertical markets such as book or newspaper publishing and have capabilities that Quark couldn't possibly include in the base program—and that only a select group of people will ever need.



Package Deals

One of the easiest ways to get your hands on XTensions you *will* use is to buy a tool kit—either QX-Tools, from Extensis ($149.95; 800/796-9798, www.extensis.com), or XPert Tools Volume 1 or Volume 2, from a lowly apprentice production ($99 each; 888/818-5790, www.alap.com). These packages bundle some of the most commonly requested features, such as a Layers palette, better document-navigation tools, and precision scaling of grouped objects.

Which package should you buy? While both provide similar tools, each offers distinct features. For instance, QX-Tools includes QX-VectorEdit, which imports EPS and PDF files as editable QuarkXPress objects. Have a Microsoft Excel chart you really need in XPress? Write it to disk as a PostScript file and open it with this XTension—you can even edit the chart's colors and strokes right in XPress. XPert Tools Volume 2, on the other hand, includes XPert TextLink, which lets you link and unlink text boxes in ways that would otherwise be impossible. Comparison-shop to find out which package contains the tools you most need.

Pre-Preflight

You've heard of preflighting documents so they print correctly. Gluon's QC 4 ($149; 888/458-6698, www.gluon.com) is what we should all use to prepare documents—even before preflight. QC (which stands for "quality control") checks a QuarkXPress document against a user-defined list of quality concerns.

QC can search for common problems such as incorrectly applied colors, accidental horizontal scaling or tracking, empty boxes, RGB images (instead of CMYK), and even boxes a few points off their alignment. But QC goes beyond that, searching for problems like too much ink coverage, rules that are the wrong thickness, and lots more. If you want, QC can fix the problems for you. And when you're ready to send the document to a

continues

service bureau, QC collects your documents, fonts, and graphics into neatly organized folders and relinks pictures to their new locations. The decision to buy this $149 XTension is a no-brainer.

A Superior Palette

Importing native Adobe Photoshop files into QuarkXPress isn't a new trick, but ImagePort, from lowly apprentice ($149), does it so elegantly that you may not remember whether you're working in Photoshop or XPress (see *Reviews*, elsewhere in this issue). ImagePort can read most layered Photoshop files and can hide or show each layer as you wish.

Similarly, ImagePort's Channels palette lets you manipulate the various channels in a document. This is invaluable when you're using spot-color channels, because you can merge channels, change their colors, or even turn them off. If your workflow would benefit from the ability to get Photoshop files directly into XPress, this XTension is for you.

Scaling Deluxe

While both XTension bundles I mentioned earlier have scaling tools in them, nothing compares to Gluon's ProScale 5 ($129). Want to scale a multipage document from letter size to A4 or tabloid size? ProScale does it easily. Need to scale all your horizontal lines by 10 percent? Or fit all your text boxes into a 4-pica column? With ProScale, it's no problem.

ProScale is the most powerful scaling tool out there, but it's also more expensive than the alternatives. (Gluon offers competitive upgrades to owners of other vendors' scaling XTensions, and also bundles ProScale with several other XTensions in the $249 ProPack.) If you only occasionally scale objects, this tool may outstrip your needs, but any busy production department will want a copy of ProScale on hand.

Where to Find XTensions

So where do you find these whiz-bang tools? Most developers offer information about their XTensions on the Web, and some even sell directly from their sites. But the easiest way to get information about almost all XTensions is from one of these distributors:

In the United States, The PowerXChange (800/940-8737, www.thepowerxchange.com);

In Europe, CoDesCo ([49] 40-713-00-130 [Germany], www.codesco.com).

You can also download demos of XTensions and find many freeware and shareware XTensions at www.xpressobar.com.

Great XTensions

So many XTensions, so little time to explore them all—here are a few more worth a look.

• Imposer 2.0 from lowly apprentice is a good XTension for imposition (printer spreads, for instance). If you're a printer, you'll want one of the powerful $2,000-plus programs that does this, but for designers and small shops, at only $199.99 Imposer pays for itself pretty quickly.

• Quark has announced that XPress 5 will include a basic table editor, but if you need one now (or if you create really complex tables), you should explore one of the table-making XTensions from Tableworks (307/778-9378, www.tableworks.com). Both Tableworks Plus ($179) and Table-2000 ($199) are great tools for building tables in QuarkXPress.

• Everyone has to build a drop shadow in XPress sooner or later. If you only have to do one or two, Photoshop is the answer. If you've got a boatful, then check out ShadowCaster, from lowly apprentice ($99.99), or QX-Effects, from Extensis ($129.95). Both offer good tools, though each uses slightly different methods to create shadows.

• Em Software's Xdata ($300; 877/984-1010, www.emsoftware.com) is *the* tool for publishing database and spreadsheet data. If you find yourself formatting this kind of data manually, slap yourself and go look for this XTension.

Get Efficient

Granted, if you're paid by the hour, expanding QuarkXPress's feature set with these XTensions might just make you too efficient (of course, your boss need never know). But anyone who really depends on maximizing productivity would be foolish not to take advantage of these tools, which are easy to get ahold of (see "Where to Find XTensions") and are usually easy to use as well. Best of all, most XTensions come from smaller companies that can offer better personal service, customization, and bug-fixes than larger companies can. So go ahead—XTend yourself. m

Refined Control ImagePort's palette bears a remarkable resemblance to that of another program we all use. Like Adobe Photoshop, ImagePort lets you turn layers and channels on and off. But ImagePort also lets you control clipping paths and runaround in XPress and even merge spot-color channels.

DAVID BLATNER is the author of *The QuarkXPress 4 Book* (Peachpit Press, 1998) and a coauthor of *Real World Photoshop 5* (Peachpit Press, 1999) and *Real World Scanning and Halftones* (Peachpit Press, 1998). He can be reached at david@moo.com.

New XTensions in QuarkXPress 4.1

QUARKXPRESS 4.1 ($849, OR FREE FOR AN UPGRADE FROM XPress 4.0 to 4.1; 800/676-4575, www.quark.com) is primarily a bug-fix upgrade, but it comes with a number of cool new XTensions. Some of these you might use only occasionally (like Super Step And Repeat, which lets you rotate, scale, and tint an object as you make duplicates of it); others, however, are more useful. These are some of my favorites.

HTML Filters QuarkXPress now lets you export text stories in HTML format. You still need a separate XTension like BeyondPress, from Extensis ($249), to convert pictures and page geometry, but this free tool is great if you're trying to get a story into Macromedia Dreamweaver or Adobe GoLive. Even better, you can now import HTML files into an XPress text box.

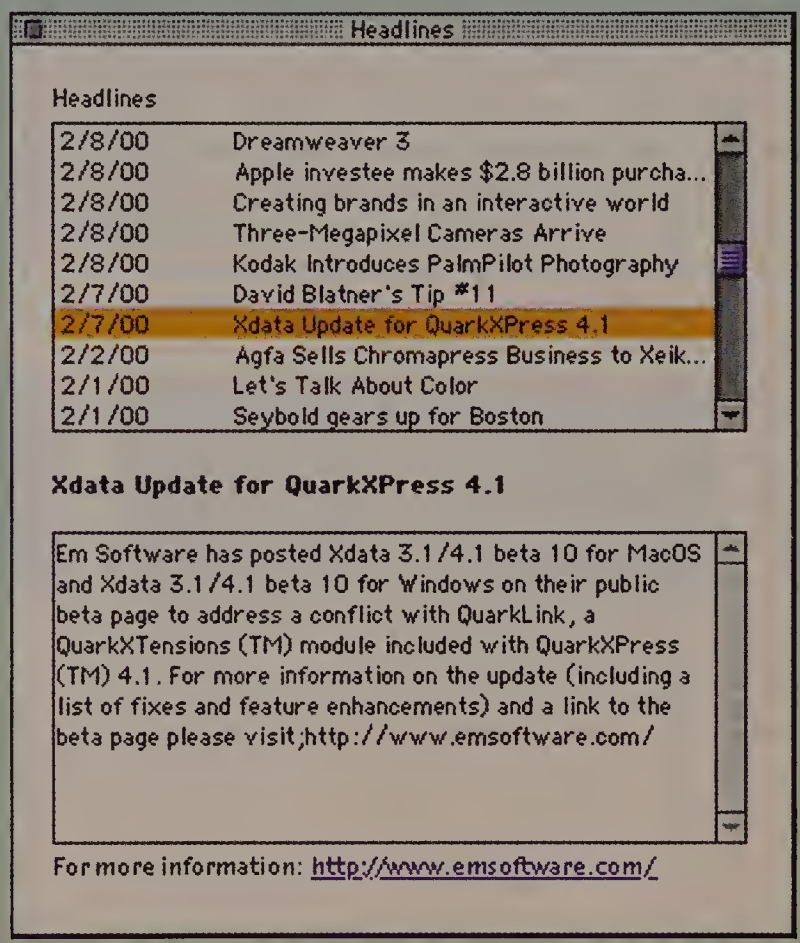
PDF Filters The PDF Import and Export XTensions should finally silence complaints that QuarkXPress doesn't support Adobe Acrobat PDF files, but there's a caveat. While this tool makes it easy to export PDF files (although you still need Acrobat Distiller), the PDF Import filter can't yet read files from Acrobat 4 or Adobe InDesign. Quark has already promised an update to address this shortcoming.

QuarkLink The QuarkLink XTension uses the Internet to shorten the distance between you and Quark corporate headquarters. A new Headlines palette can display daily or weekly news from Quark (including a weekly QuarkXPress tip from yours truly). Sending e-mail to customer service or technical support is only a menu item away, as is a direct link to Quark's online knowledge base.

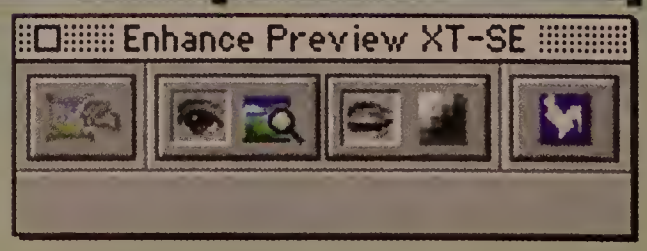
Enhance Preview XT-SE One of the most important XTensions included with version 4.1 is Enhance Preview XT-SE, which considerably improves the display of TIFF and JPEG images. This "special edition" of a commercial product from Koyosha Graphics works on only one image at a time, so you might consider buying the full version, Enhance Preview XT ($99; www.koyosha.com).

An Added Bonus The XPress 4.1 upgrade disk (shipped free to all registered users of version 4), contains a number of free XTensions from third-party developers. For instance, Badia FullMeasure lengthens your Measurements palette so you can quickly control more paragraph formatting. David's Place 1.5 puts a Place command in your File menu so you don't have to draw a picture box before you import text or graphics. (It also lets you drag and drop images and text into XPress from your desktop.) FontWizard lets you embed fonts into EPS documents.

All of these XTensions perform tasks I wish QuarkXPress could do by itself. Until that day comes, though, you can rely on XTensions to pull off these tricks.



News Direct With QuarkLink and an Internet connection, you can view the Headlines palette, which offers daily tips and news Quark thinks is relevant to your work (this is partially customizable).



A Better View XT-SE can dramatically improve the screen previews of TIFF and JPEG images in QuarkXPress, though the free version works on only one image at a time. That's plenty for adjusting clipping paths or positioning type or lines over an image, which has always been difficult in XPress.

Create

WEB

Flash with Substance

CREATING WEB GRAPHICS WITH MEANING, USING MACROMEDIA FLASH

by Frith Breitzer

One problem with Macromedia Flash animations is that they're often all flash and little substance. With such power—animation, video, still images, and sound—under your control in one program, it's tempting to add so much to your Web design that you end up obscuring your message. Artist Hillman Curtis, former art director at Macromedia, does just the opposite. His goal is to communicate effectively using motion graphics.

He begins each piece by working with his clients to divine the project's emotional focus, which he then tries to present to his audience in a resonant way that reinforces his client's brand. Often, he employs simple themes represented by minimal design elements. Although he uses video and animation effects, Curtis is careful not to let meaningless eye candy intrude on his message.

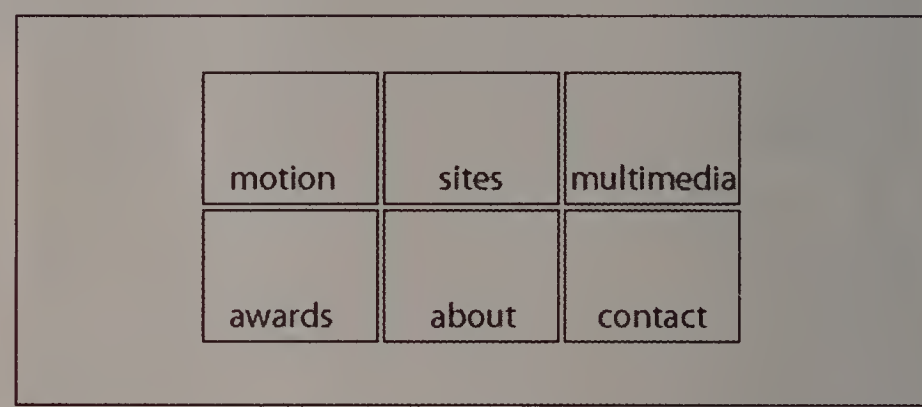
"You have an emotional epicenter," he says of his work. "You can't convolute it. You can have things that add to it, but I want the audience to focus on one message."

He applied that idea when he created this navigation scheme for his own Web site (www.hillmancurtis.com). He chose images, such as film-leader effects (see Step 2), that convey the idea of motion. Because he was aiming at a global audience, he used the familiar symbol of an opening eye to encourage visitors to look inside.

He created this piece when, as he puts it, "it was still a 28.8-Kbps modem world." Even now, he keeps his files small so they'll download quickly over slow modem connections.

Curtis used Macromedia FreeHand for his preliminary layout. In Adobe Premiere, he edited his movie clips, which he then exported as a series of sequential bitmaps. After editing the bitmaps in Photoshop, he used Flash to create buttons with interactive rollover effects.

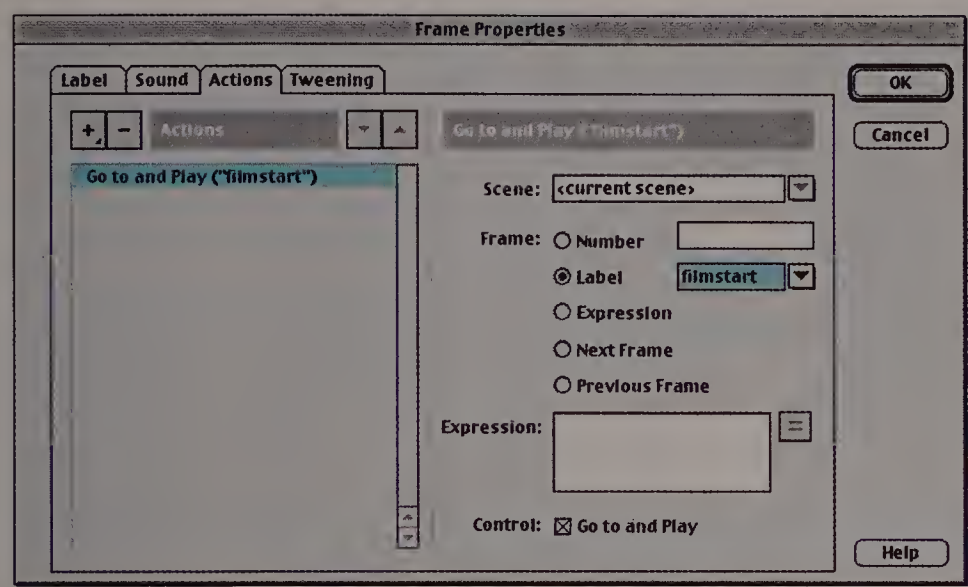
Curtis used three 350MHz Mac G3s with 256MB of RAM, along with two Dell Precision 610 workstations and a Sony GX9 laptop with FireWire. He captured images with a Sony TRV9 DV camera. m



1 Curtis began with a preliminary layout in FreeHand, which gave him precise control over text alignment. He imported the file, which had the same dimensions that he wanted in his final document, directly into Flash.

2 In Premiere, Curtis edited clips of old film-leader effects and his own video of a blinking eye. For projects such as this, which he's aiming at a wide audience, he sets the frame rate to 12 frames per second or slower and tests the results on a slow computer with a 28.8-Kbps modem.

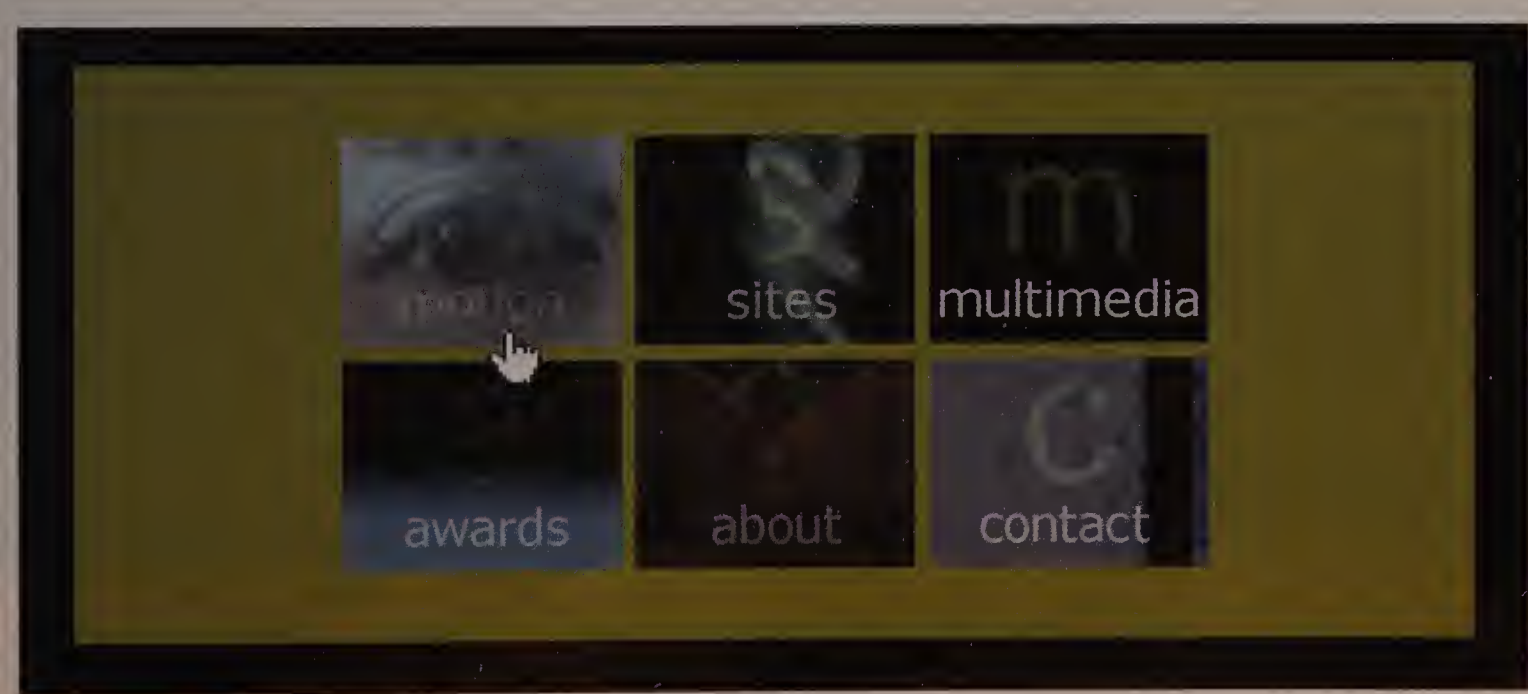
Assistant Editor FRITH BREITZER worked as a freelance Web designer. Now she covers imaging, displays, and systems for *Macworld*.



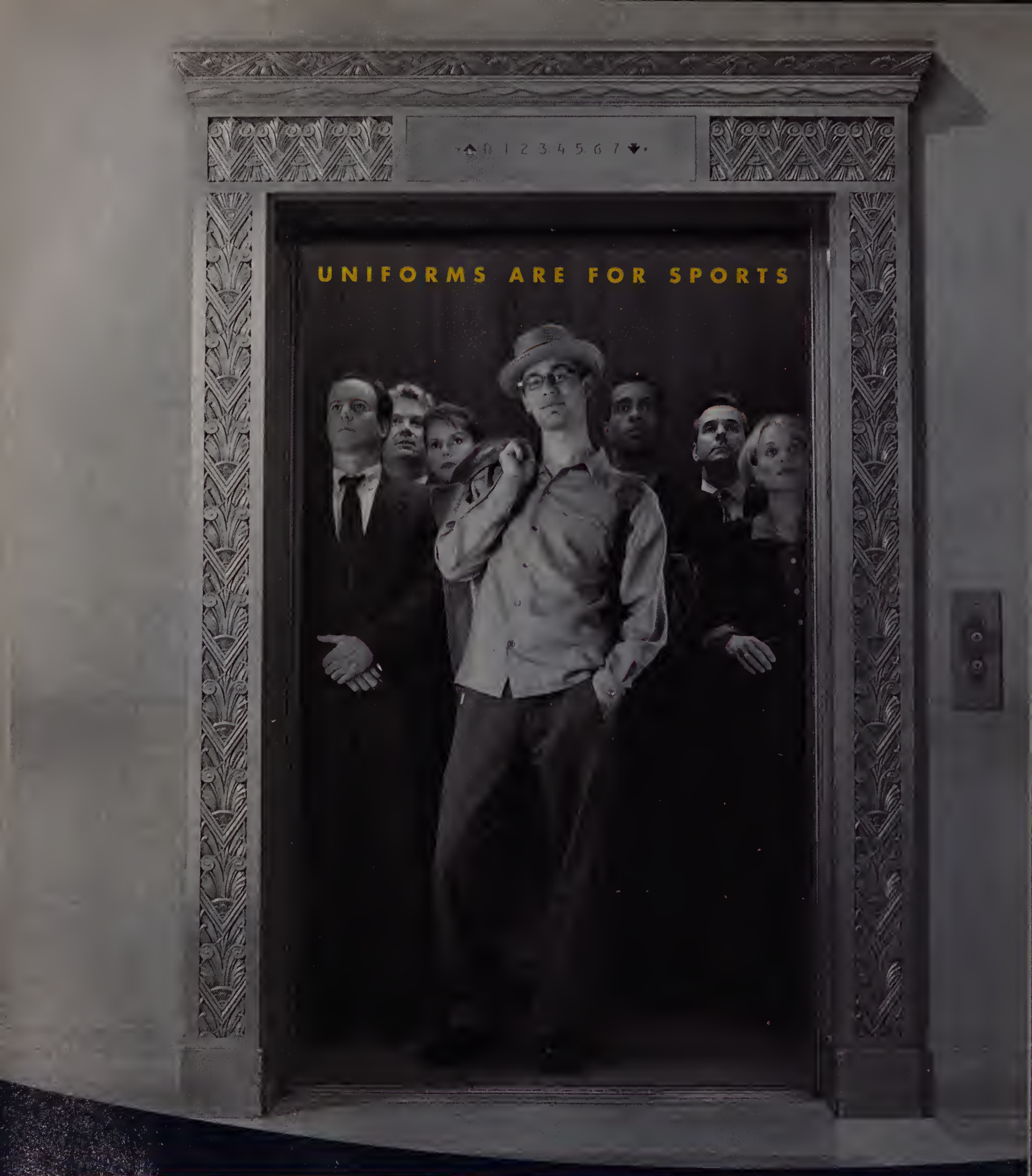
3 Curtis exported the two resulting videos as series of sequential bitmaps, cleaned them up in Photoshop, and then imported them into Flash as movie clips. He used Flash's Edit Multiple Frames feature to align the bitmaps and then created layers for labels and actions. To create a looping effect, he used the Go To And Play action (shown here) to tell Flash to return to the beginning of a movie clip once it reached the end. Because the movies are made up of short, repeating sections, they will load faster on users' machines.

4 Finally he defined the Up, Over, Down, and Hit states of the Flash buttons so that after the buttons load in a user's browser, the film-leader clips will play. When a user mouses over a button, Curtis's video of the blinking eye will appear. To make each button act as a link to a new page, Curtis added On Release mouse events.

Curtis placed the text in the button layer so that the name of each section would be visible at all times.



Eye-Opening Communication The navigation scheme Curtis designed for his Web site reflects the site's purpose: promoting the use of motion graphics to communicate ideas. Each of these buttons contains a video clip that plays continuously. When a user mouses over a button, a clip of an opening eye plays.



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Animation in a Flash

DON'T SLAVE OVER ANIMATIONS—LET MACROMEDIA FLASH DO THE WORK

by Dave McFarland

After the initial blush of creating your first Web site wore off, you realized that the picture of your cat on the sofa didn't make a compelling presentation. You tried the conventional tricks for spicing up a Web page: background images; colored text; and of course, animated GIFs. But now you're ready to give your visitors a more engaging experience. To really bring your Web site to life, nothing beats motion—graphics flying across the screen, scrolling text, and images fading in and out. Though animating an otherwise lifeless Web page may seem daunting, Macromedia's Flash 4 can make the job easier with tools that do the most tedious and time-consuming parts for you.

Macromedia built Flash with the Web in mind; it generates small file sizes that perform well in almost all browsers. The Flash format—designated SWF—offers several advantages over other animated-graphics file formats. For starters, Flash is vector based. Unlike bitmapped images such as GIFs and JPEGs that must store information for every single pixel of a graphic, vectors use a mathematical formula to describe the shape, color, and position of an image. This takes up much less room. And smaller file sizes mean even complex animations will download quickly.

Flash files require that visitors to your site have the free Flash Player installed before they can view a Flash movie. But once they have it, you can rest assured that everyone is seeing the same thing. Unlike other Web animation tools, such as Dynamic HTML, which don't work with early browsers and often act inconsistently in later browsers, movies you create in Flash look and behave the same in every browser and platform that supports the plug-in.

A Moving Experience

In the early days of animation, illustrators had to draw tens of thousands of frames by hand to produce a feature-length animated movie—an excruciatingly tedious process. Senior artists didn't bother with this grunt work. They drew only the crucial frames needed to portray the action—for instance, a picture of an archer before he draws his bow and a picture after he has pulled the arrow back. Junior illustrators drew all the intermediate frames needed to simulate the motion. This process became known as *tweening*.

Thankfully, we no longer need an army of junior animators to take care of the tiresome drawing details. Flash has its own set of tweening tools that make creating animations for the Web a cinch. Although you *can* draw animations frame by frame in Flash, not only is it time-consuming and monotonous but it also significantly increases the file size of your final animation because Flash must store much more information. With tweening, you need to define only a beginning frame and an ending frame for your animation, and Flash creates all the frames in between.

Flash offers two kinds of tweening: motion tweening and shape tweening. As its name suggests, motion tweening animates an object's movement—a baseball thrown across the screen, for example. But motion tweening does much more than that. It can change other attributes of a drawing, including size, rotation, skew, color, and opacity, even when the object doesn't move. For instance, you can use motion tweening to make a white

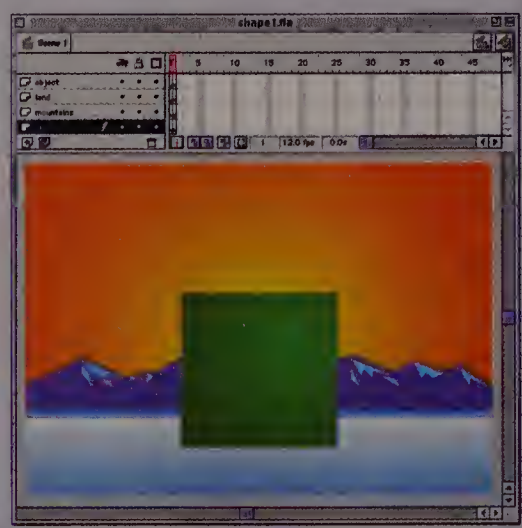
continues

ANIMATION ALCHEMY

Shape tweening's magical formula saves you time

YOU MIGHT not have the power to turn a lump of coal into the Solid Gold Dancers, but with its handy shape-tweening tools, Flash 4 does. However, there are limitations—shape tweening doesn't work with every type of image. Flash's shape tweening supports only vector shapes, such as objects drawn with Flash's drawing tools or other vector-based illustration programs.

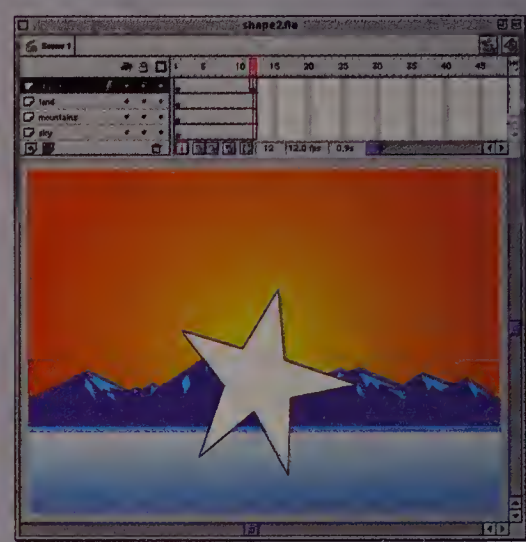
In this project, I used Flash's shape-tweening tools to transform a square into a star. I started with the opening image of a square against a distant mountain range. To control the elements independently, I placed each piece—sky, ground, and square—on a separate layer (represented by a horizontal bar in the timeline). (The final version of this Flash movie is available on *Macworld*'s Web site at www.macworld.com/2000/06/create/.)



1 You must first decide how long to make your movie by adding frames to the timeline. Let's say you want a fast animation, lasting only a second or so. Since the Flash file is set to run at 12 fps (the default setting), the movie will require at least 12 frames. To add them, click on the timeline at frame 12 of the top layer and drag downward until you've selected frame 12 in all the layers. From the Insert menu, select Frame. This inserts frames from the beginning of the movie to the specified point.

2 Clicking on any of the newly inserted frames shows a duplicate of the original image. To change this image, you have to add a keyframe. Keyframes (indicated by a black dot in the timeline) are the only kind of frame you can alter; Flash controls the other frames. To add a keyframe to the end of the movie, click on frame 12 of the square layer and select Blank Keyframe from the Insert menu.

A blank keyframe removes the image that previously appeared on the layer—in this case, the square. If your change requires altering the original image—giving a monster a second head, for example—you may not want to start with a blank keyframe. In that case, choose Keyframe from the Insert menu, and you'll have an editable copy of the previous image.



But since this project calls for an entirely new drawing—the star—a blank keyframe is the best choice. Then you just use the pencil tool to draw a simple star in the blank keyframe, and you've got the two shapes in place and ready for tweening.

3 To begin the metamorphosis, open the Frame Properties dialog box by double-clicking on the first frame of the square's layer. Select the Tweening tab and choose Shape from the pull-down

cat gradually turn black. (For an introduction to motion tweening, see the sidebar "On the Move.")

Shape tweening, on the other hand, animates the transformation of one object into another—a cat that morphs into a pumpkin, for example. But shape tweening can also incorporate motion. When you transform a cat at the bottom left of the screen into a pumpkin at the top right, you use the shape-tweening tool. (For more on shape tweening, see the sidebar "Animation Alchemy.") To keep these two types of tweens straight, just focus on your primary goal. If you want to animate changes in one drawing, use motion tweening. If you want to change one drawing into another, use shape tweening.

Stage Directions

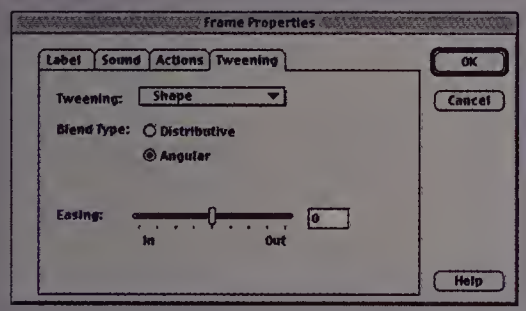
Before you can create your own online animations, you have to acquaint yourself with Flash's terminology and tools. The main work area is called the *stage*. You can use Flash's drawing tools to create graphics and text on the stage, or you can import graphics from other vector-based programs such as Macromedia FreeHand and Adobe Illustrator. You can also import bitmapped-image files such as PICTs and JPEGs into a Flash movie, but you'll sacrifice the small file sizes of Flash's native vector-based drawings.

Above the stage is the *timeline*, which displays the layers and frames of your Flash movie. Layers appear on the left side of the timeline and—like layers in programs such as Adobe Photoshop and FreeHand—they organize your images. In Flash it's especially important to keep objects on separate layers so that you can move them independently in your animation. Frames are what make a movie—a single frame is just one image, but a series of frames is the sequence of images that make an animation. The timeline lays out frames horizontally from left to right. When you click on a frame in the timeline, you see the stage at a particular moment in the movie.

Flash lets you control how many frames per second (fps) your movie plays. The higher the fps rate, the smoother the animation. By default, Flash sets the frame rate for its movies to 12 fps—a good setting for the Web, as it balances smooth animation with reliable playback.

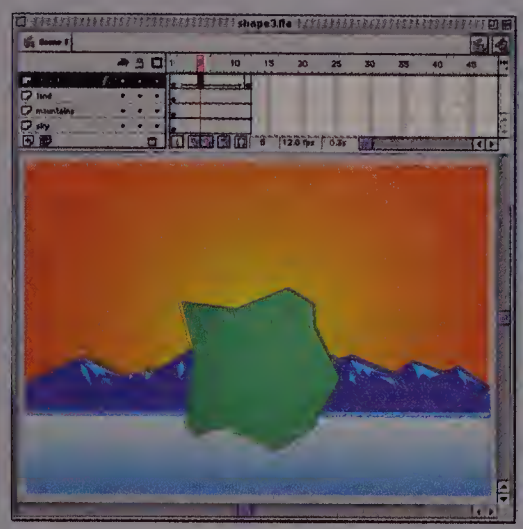
menu to turn on shape tweening. Below this menu is the Blend Type option. This setting adjusts how Flash draws angles, corners, and lines in the tweened intermediate frames. If you're tweening shapes that have smooth curves, the Distributive option will preserve the curves of objects.

Since this project involves tweening two shapes with sharp angles and no curves, you should choose the Angular option, as it preserves corners and straight lines in intermediate frames. The Easing slider adjusts the speed of



the animation's beginning and end: if you want the tween to begin slowly and end at a faster pace, set the slider to In. For the reverse effect, move the slider toward Out.

4 The tweened layer in the timeline now displays a solid line between the two keyframes, and it's green, indicating that the shape tween is active. You can



play the animation to test how successful the tween was—just press the return key. You can also select individual frames in the timeline to compare each step of the transformation. Unfortunately, this shows that the transformation is not very smooth: the square looks like a crumpled piece of paper as it turns into the star.

5 You can help Flash maintain a smooth transition by using *shape hints*. A shape hint tells Flash how to transform one shape into another by mapping individual points on the starting shape to points on the ending shape.

With the square in the first keyframe selected, open the Modify menu and select Add Shape Hint from the Transform menu. A red circle containing the letter *A* appears in the center of the square. (Flash labels hints alphabetically starting with *A*.) Move the hint to the upper left corner of the square. When the first hint is in place, return to the last keyframe and move the corresponding red-circle hint to the top left

point of the star. The red circle turns green, indicating that the shape hint is complete. Repeat this process for the other three corners of the square. Shape hints work best placed in counterclockwise order, with the first hint beginning in the top left corner of the shape. After you've placed four hints on the square and the star, the animation tweens much more gracefully.

Unlocking Keyframes While frames make up your movie, you can adjust the images only in a special kind of frame: the *keyframe*. Keyframes can control any kind of change in your animation, including an object's movement, shape, size, and color. A simple animation, such as a ball rolling across the floor, might require only two keyframes—one for the beginning and one for the end. But to make the ball bounce back and forth across the screen while changing colors might require a dozen or more keyframes controlling changes in direction, speed, and shade.

Size-Slimming Symbols Flash is able to maintain its fast downloads despite complex motion tweenings with the use of *symbols*, single objects such as text or drawings used multiple times in the same movie. Symbols don't add to the file size. When you motion-tween an object, Flash converts the image into a symbol and places it in the movie's library, a convenient storage space for repeated elements. When Flash needs to use the graphic again, it inserts an *instance* of the symbol.

Adding an instance to your movie doesn't change the movie's file size, because you're not adding the actual information for the drawing (all the lines, curves, and colors that make it up)—you're just adding a pointer to that information. For example, by turning a 2K bitmapped image of a star into a symbol, I could place a thousand instances of that star onto the dark nighttime background of my movie without increasing the file size.

Connecting the Dots

Tweening is the backbone of Macromedia Flash's animation power. Once you've mastered these basics, you can quickly develop complex animations that infuse life into a formerly flat, dull Web site. Try combining changes in a drawing's size, rotation, color, and transparency in one tween, or tween drawings on separate layers to animate many elements on the screen simultaneously. Tweening is as easy as letting Flash connect the dots. **m**

DAVE McFARLAND is a partner in SkyMind Development (www.skymind.com), a Web development company. He also teaches Web-site design at the Academy of Art College and the Center for Electronic Art in San Francisco.

continues

ON THE MOVE

Bring Web animations to life with motion tweening

ANIMATION can be monotonous work. Fortunately, Flash 4's motion-tweening abilities will do most of the work for you. With motion tweening, you can easily animate changes in an object's position on the screen and its rotation, size, and even color and opacity. You need to define only the starting and ending points of your animation, and you can tell Flash to take care of the rest.

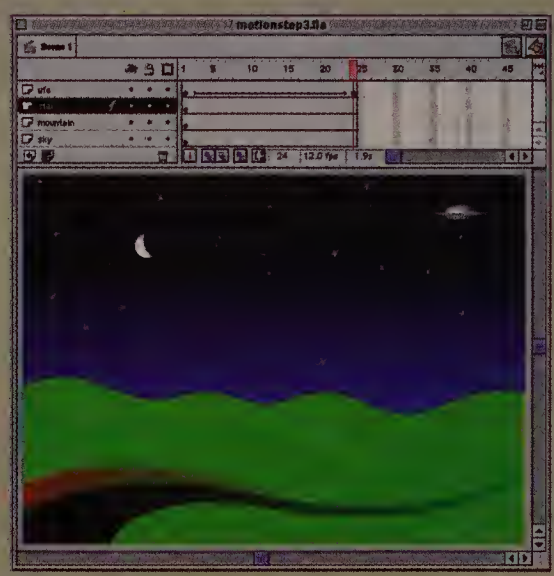
In the following example, I wanted a spaceship to zoom into the scene, turning and shrinking as it flies off into the distance. As with the shape-tweening project (see the sidebar "Animation Alchemy"), I started by placing all of the illustration's elements—hills, sky, stars, and UFO—in their own layers for independent animation. (The final version of this Flash movie is available on *Macworld*'s Web site at www.macworld.com/2000/06/create/.)

1 To send your UFO flying into action, you have to add some frames to the movie. To produce a 2-second animation at 12 fps, you need 24 frames. (See step 1 in "Animation Alchemy" for instructions on adding frames.) Once you've inserted the frames, you can play the movie by pressing the return key. But since all 24 frames currently show the same image, nothing happens.

2 To move the UFO across the stage, you first need to indicate where the motion starts. In the timeline, select the first frame of the UFO layer and choose Create Motion Tween from the Insert

menu. In the timeline, all the frames on that layer turn blue, and a dashed line appears. The blue indicates that those frames are part of a motion tween, and the dashed line means the tween is still incomplete—you've defined only the starting position of the UFO.

3 Next you must define where the animation should end. To make the animation span the entire 2-second movie, you must insert a keyframe in the final frame. (For more on keyframes, see step 2 in "Animation Alchemy.") Click on frame 24 of the UFO layer and select Keyframe from the Insert menu. On the timeline, a



solid dot appears in the frame, indicating that it's a keyframe. You'll also notice that the dashed line turns solid with an arrow at the end, telling you that the motion tween is complete.

At this point, if you preview the movie, you'll find that the UFO hasn't actually gone anywhere. To make it take flight, you have to alter the UFO's position in the second keyframe. Simply grab the UFO in the last frame and drag it to the new position. Flash redraws all of the in-between frames. Now when you play the movie, the UFO streaks diagonally across the screen.

4 Although the UFO now moves in the right direction, the animation still looks very flat. To spice things up, you can make the UFO seem to zoom past the viewer and recede into the distance. In a motion tween, you're not limited to moving an object across the screen. You can tween size, rotation, and color as well.

For this effect, you need to open the first frame in the UFO layer. The UFO graphic is automatically selected on the stage. First drag the UFO to the lower left edge of the movie, just outside the stage. Increase the UFO's size by selecting the Scale Modifier tool from the drawing tool bar. Eight square handles appear around the UFO's selection box; moving any of the four corner points resizes the UFO proportionally. To make the UFO rotate slightly as it travels across the night sky, select the Rotate Modifier tool. Drag one of the eight round handles that appear around the selection, and then rotate the UFO to about a 45-degree angle.

You can continue fine-tuning the animation by adjusting the UFO's flight pattern, size, and speed. Simply insert new keyframes at any point in the animation to signal a change.

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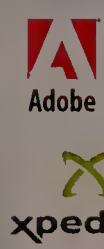

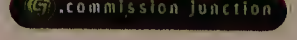

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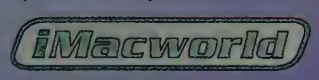

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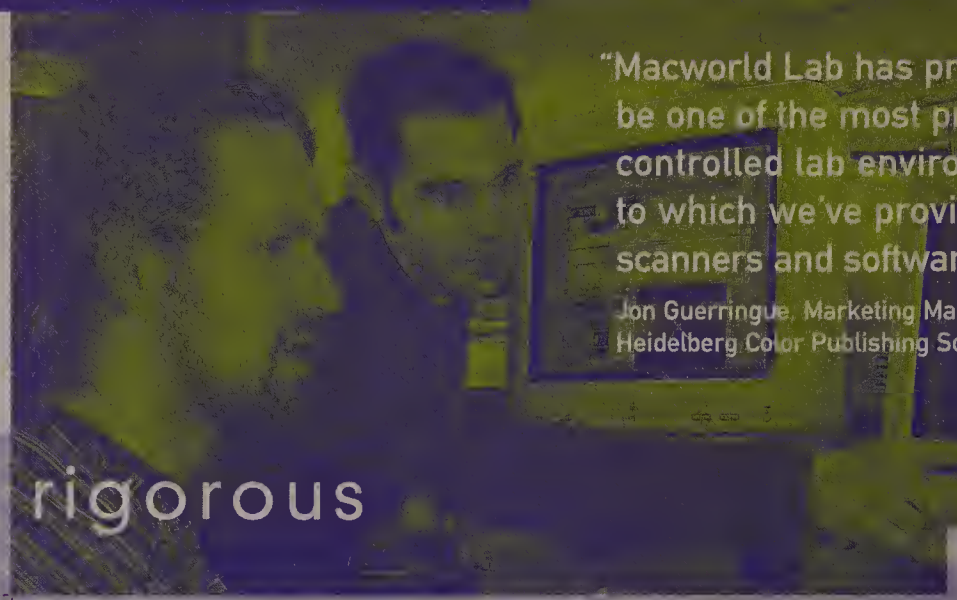

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Adobe	www.adobe.com	14, 15
AEC Software	www.aecsoft.com	10
Agio	800-688-2446	48
Alsoft	800-257-6381	12
American Power Conversion	888-289-APCC ext.8935	29
Anthro	www.anthro.com	8
Apple Computers	—	1
APS Technologies	800-285-0638	136, 137
ATI Technologies, Inc.	www.ati.com	47
Canon Computer Systems, Inc.	www.CCSI.CANON.COM	2-3
Canon USA.	www.CCSI.CANON.COM	43
CDW Computer Centers, Inc.	800-509-4239	134, 135
Charles Schwab & Co., Inc.	800-3-Schwab	20, 21
Creativepro.com	www.extensis.com/mw	57
Creativepro.com	www.creativepro.com	98
Crucial Technology	www.crucial.com	6, 7
Cybration	www.icull.com	52
Dataviz	800-270-0030 ext.63	63
DeepCanyon	www.deepcanyon.com	30, 31
Diehl Graphsoft	www.diehlgraphsoft.com	22
Focus Enhancements	800-356-3920	87
Hewlett Packard	—	58, 59
Hire Knowledge	www.hireknowledge.com	16
Infowave	www.infowave.com/print	49
Infowave	www.stylescript.com	54
Intego, Inc.	www.intego.com	55
Interland, Inc.	www.interland.com	39
J&R Computer World	800-221-8180	139
Kensington	www.kensington.com/imac	C4
La Cie	www.lacie.com	53
MacMall/Creative Computers	800-222-2808	109-117
Macromedia		37
MacWarehouse	800-434-5841	126-133
MacZone	www.maczone.com	118-125
Megahaus	800-786-1184	140
Met@box Corporation	www.metaboxUSA.com	18
MicroMat	800-829-6227	24
Minolta-QMS	www.qms.com	60
Newer Technology	www.newertech.com	45
Office.com	www.office.com	73
Orange Micro	714-779-2772	50
Orange Micro	714-779-2772	56
Par Technologies / iRez	www.irez.com	42
PowerOn	www.poweronsw.com	13
ProDirect	800-524-9952	138
Ricoh	800-63RICOH	9
Sonnet Technologies	800-786-6260	88
TechWorks	800-434-4032	19
Viewsonic	800-888-8583	11
VST Technologies, Inc.	www.vsttech.com	51
XANTÉ Corporation	www.xante.com	C3

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PAGE NO.	ADVERTISER	GET-INFO
HARDWARE		
COMPUTER SYSTEMS		
C2-1	Apple	—
109 -117	Macmall/Creative Computers	131
51	VST Technologies,Inc.	73
HARD DISK STORAGE		
19	Techworks	129
136-137	APS Technologies	62
53	La Cie	—
140	MegaHaus	107
138	ProDirect	135
MISCELLANEOUS		
BRC	American Power Conversion	72
29	American Power Conversion	72
6-7	Crucial Technologies	—
C4	Kensington	1
19	Techworks	129
MONITORS/GRAPHICS BOARDS		
11	ViewSonic	—
45	Newer Technology	55
47	ATI Technologies	113
18	Met@box Corp.	—
50	Orange Micro	60
56	Orange Micro	60
88	Sonnet Technologies	132
PRINTERS		
2-3	Canon Computer Systems,Inc.	23
9	RICOH	4
58-59	Hewlett Packard	11
60	Minolta/ QMS	182
C3	Xante Corporation	112
SCANNERS& DIGITAL CAMERAS		
43	Canon USA	23
42	Par Technologies/iRez	143
MAIL ORDER		
109-117	Macmall/Creative Computers	131
118-125	MacZones	71
126-133	MacWarehouse	18
134-135	CDW Computer Centers,Inc.	2
136-137	APS Technologies	62
138	ProDirect	135
139	J&R Computer World	56
140	MegaHaus	107
SERVICES		
INTERNET PRODUCTS/SERVICES		
20-21	Charles Schwab	—
30-31	DeepCanyon	180
39	Interland	10
87	Focus	172
16	HireKnowledge	97
55	Intego, Inc.	85
73	Office.com	149
SOFTWARE		
BUSINESS/PRODUCTIVITY		
10	AEC Software	83
22	Diehl Graphsoft	46
52	Cybration	181
63	Dataviz	142
GRAPHICS/DTP		
14-15	Adobe Systems Inc.	—
37	Macromedia	36
57	Creativepro.com	14
98	Creativepro.com	14
UTILITIES		
12	Alsoft	140
49	Infowave	32
54	Infowave	32
24	MicroMat	67
13	PowerOn	118
ACCESSORIES		
FURNITURE		
8	Anthro	—
48	Agio	52

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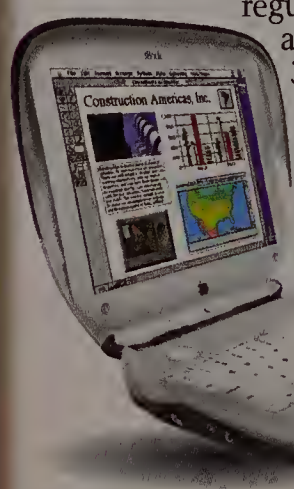

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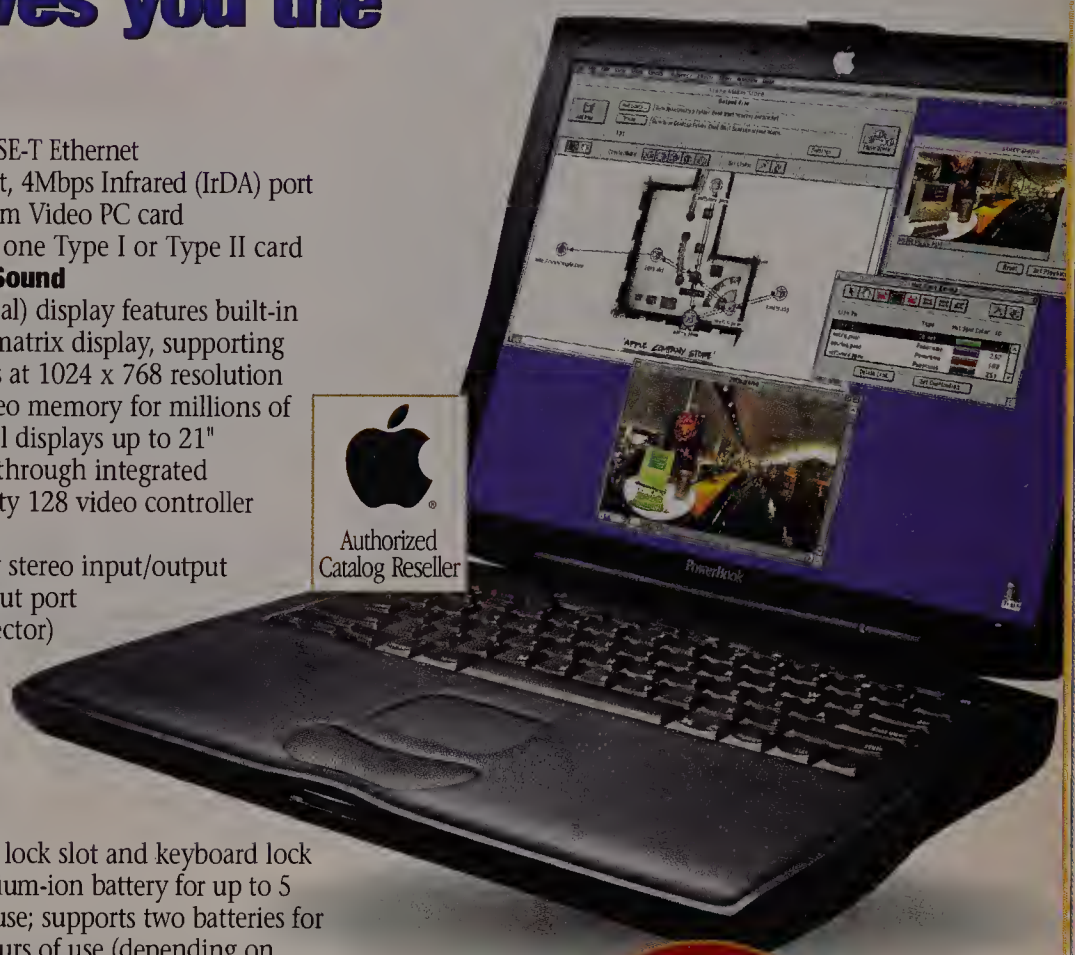

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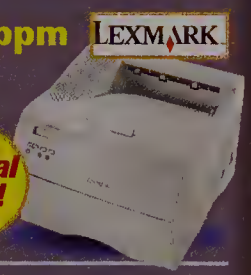

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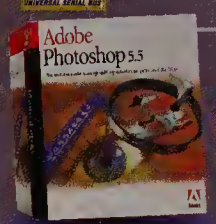

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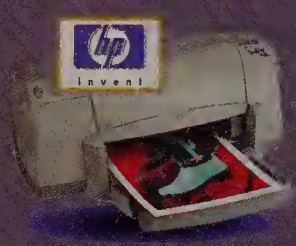

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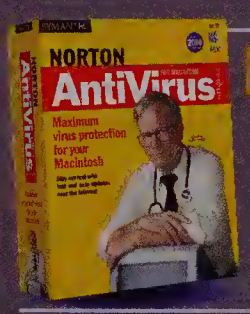

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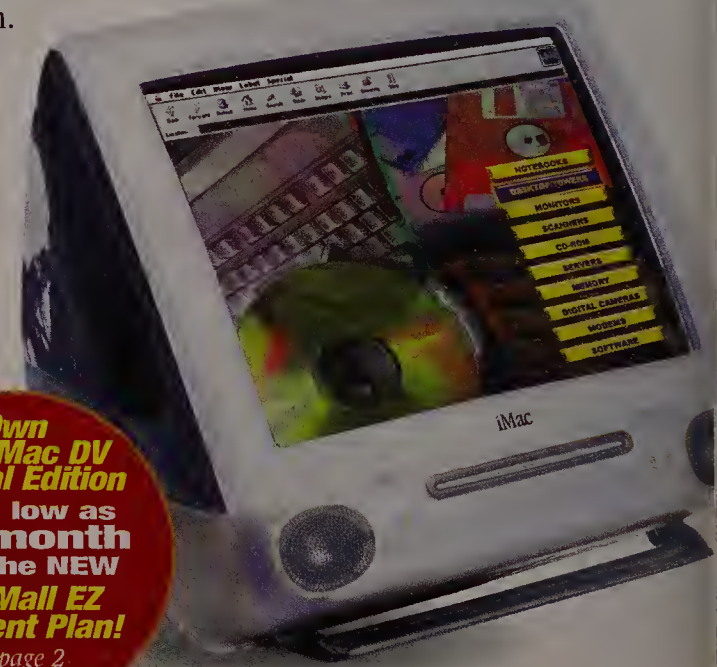

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- Built-in 56K V.90 modem
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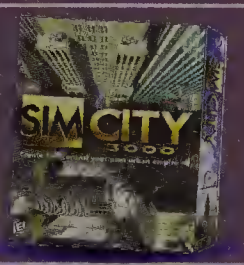

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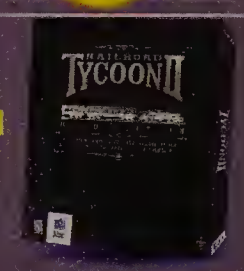

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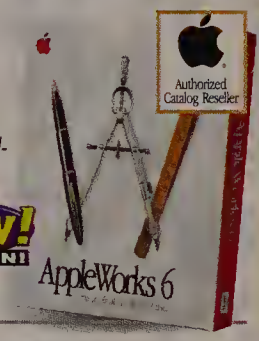

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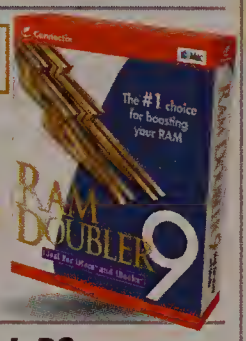

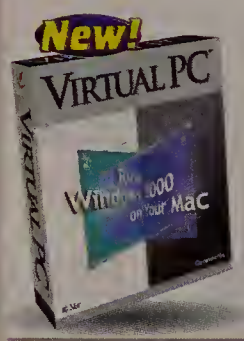

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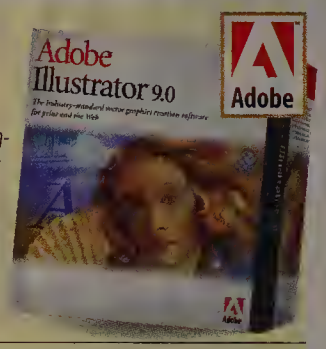

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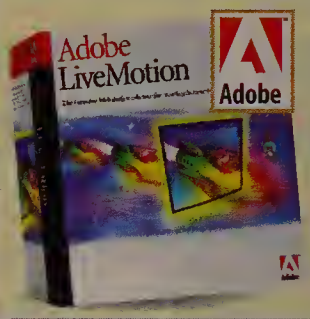

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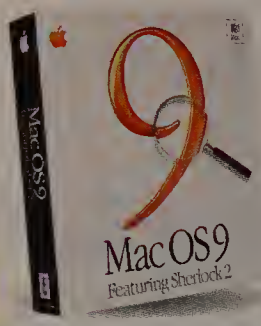

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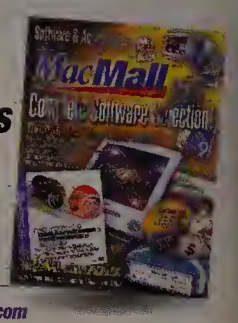

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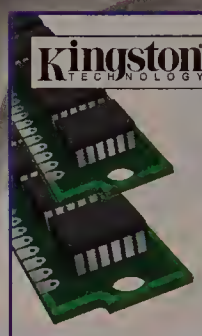

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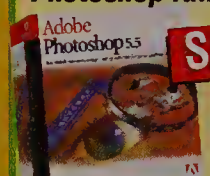

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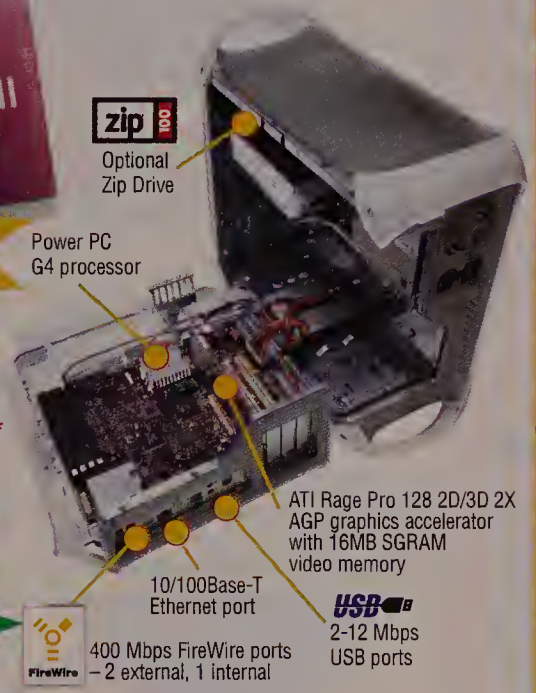

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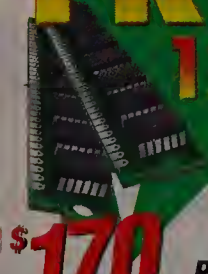

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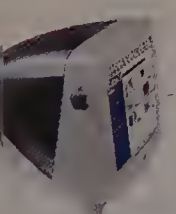

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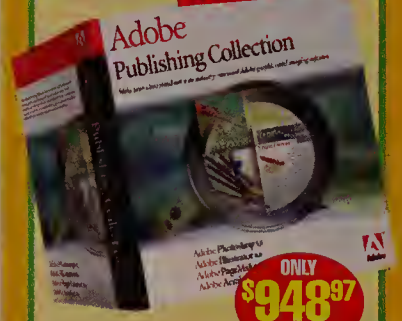

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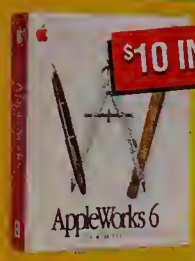

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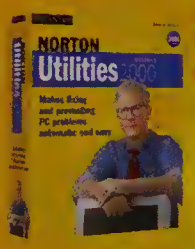

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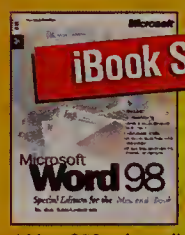

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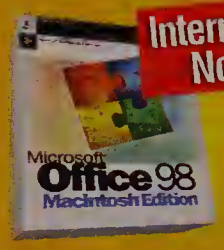

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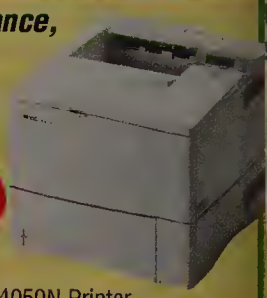

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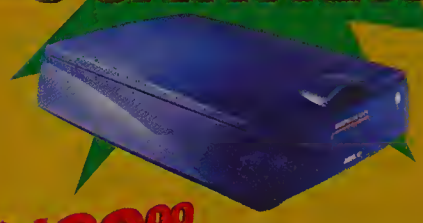

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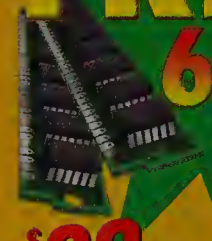

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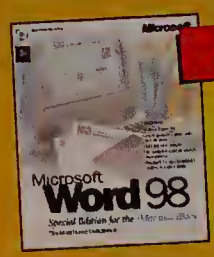

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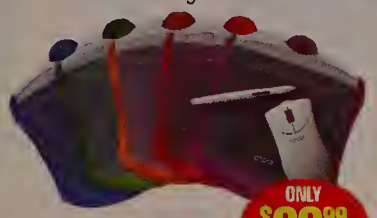

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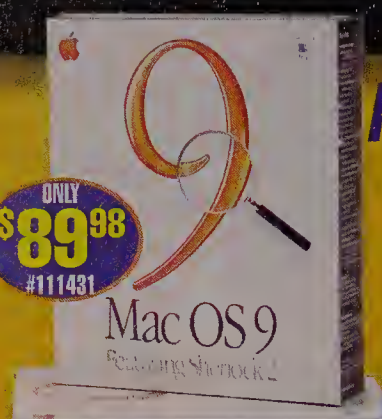

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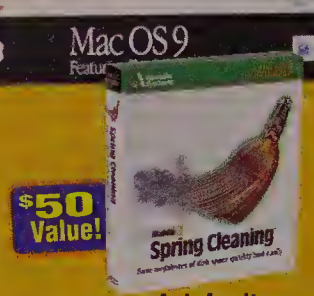

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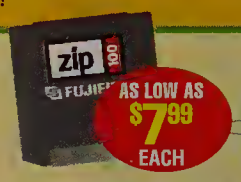

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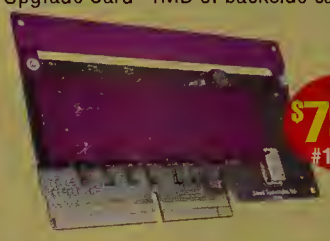

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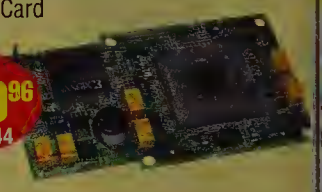

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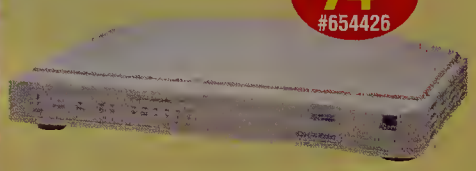

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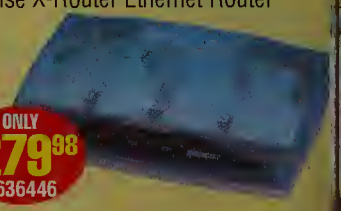

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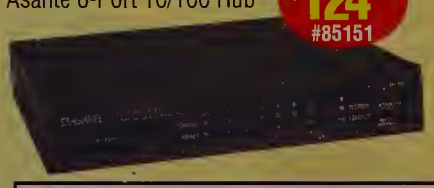

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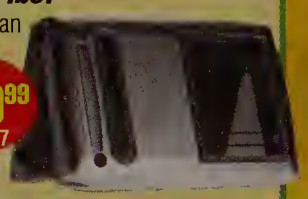

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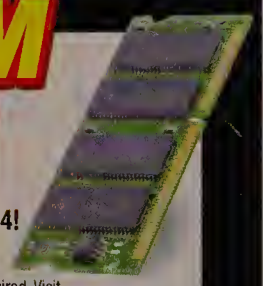

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Cooler, Sleeker iMacs - Mixed 3 different ways!

1 Apple iMac 350MHz Blueberry

- 350MHz PowerPC™ G3 processor
- 512K Backside Level 2 Cache
- 64MB of SDRAM (exp. to 512MB)
- 6.0GB Ultra ATA Hard Drive
- 24x max. slot-loading CD-ROM
- Built-in 56K V.90 modem
- ATI RAGE 128 VR 2D/3D graphics accelerator with 8MB SDRAM (AGP 2X)
- Odyssey audio system from Harman Kardon
- 15" color display
- 10/100 BASE-T Ethernet
- 2 USB ports (12Mbps ea.)
- Support for AirPort 11Mbps wireless networking (antenna built-in; AirPort card optional)

Only $999!††

Item #CPU1492

††Free Memory Offer does not apply

Lease It for $29/mo.§

2 Apple iMac DV 400MHz

Includes ALL the GREAT Features of the 350MHz Model – PLUS –

- 400MHz Processor
- Slot-loading DVD drive
- Movie-making software
- Two FireWire® ports
- 10.0GB Ultra ATA Hard Drive

Only $1299! each

Lease It for $38/mo.§

Lime:	Blueberry:	Strawberry:	Tangerine:	Grape:
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iDOCK 2 USB MULTIPORT HUB

COMPUCABLE

- Floppy drive
- Swivel Base
- 4 USB ports
- 2 Serial ports
- 1 ADB port

Only $259.99!

Item #DEH4620

Includes 3.5 floppy drive!

MYST

FREE* with any purchase from MacWAREHOUSE

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- Challenge your puzzle-solving skills in the Island world that is Myst!

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**Value based on MacWAREHOUSE pricing as of this magazine printing.

A $29.95!** Value

Broderbund

PAGE 3 OF 8

Orbit USB for Mac

Only $49.95!

Ask for item #INP1761.

- Designed specifically for use with USB
- Fits the natural shape of your hand; ideal for right- or left-handed users • Manufacturer's 5-year warranty

KENSINGTON

HP DeskJet 970cse Printer

Only $399.95!

Ask for item #PR15465.

- 12ppm black • 10 ppm color
- PhotoRet III technology • USB compatible

Black Ink Cartridge, only $29.99, item #67208.

Sony Digital FD73 Mavica

Only $499.95!

Ask for item #IN7834.

- 10x optical zoom • E-mail mode • 2.5" Color LCD • VGA resolution • Quick Access 2X Floppy Disk Drive • Picture effect • File copy/disk copy

SONY

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with any new iMac DV!

CALL FOR A FREE FULL-COLOR CATALOG!

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3 Apple iMac DV *Special Edition*

- 400MHz PowerPC™ G3 processor
- 128MB of SDRAM (exp. to 512MB)
- ATI RAGE 128 VR 2D/3D graphics accelerator
- 13.0GB Ultra ATA HD drive
- 4X max. slot-loading DVD-ROM drive
- Built-in 56K V.90 modem
- 15" color display
- 512K Backside Level 2 Cache
- Harman Kardon Odyssey Audio System
- 10/100BASE-T Ethernet
- Dual FireWire® ports
- Two 12Mbps USB ports
- Support for AirPort 11Mbps wireless networking (antenna built-in; AirPort card optional)
- Preinstalled iMovie software

Only $1499! Item #CPU1498

Lease It for $44/mo.§

• Cool See-thru Graphite Housing!
• 128MB RAM!
• 13.0GB HD!
400MHz!

Get MORE POWER for your 350 — 400MHz iMac!

Our Apple Authorized technicians will install your RAM for only $29.95 when you purchase your new iMac and memory upgrade together!

Ask for item #INSTL10.

Upgrade to:	Size/Type	Item #	Price
96MB	32MB PC100	CHP1041	$99.95
128MB	64MB PC100	CHP1037	$199.95

Memory prices subject to change.

Iomega 100MB USB Zip Drive

Only $129.95! Item #DR9464

Zip Disk sold separately.

Iomega 100MB Zip Disks as low as $8.99! each, in 20-pk.

20-pack (gray): only $179.80, #BND3616.

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Only $104.99! Item #DEP1734

- Connects your iMac to LocalTalk printers and other Macs
- Easy plug-and-play installation

Farallon

Ethernet iPrint Adapter for Stylewriter, only $79.99, #DEP1739.

Canon ELURA DV Camera

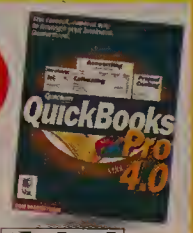
Was $1599.95: Now Only $1499.95! Item #IN8176

- 12x Optical/48x Digital Zoom
- IEEE 1394 Terminal In & Out
- 2.5" LCD & Color Viewfinder

Canon

Quickbooks Pro 4.0

Only $179.95! Item #FIN1007



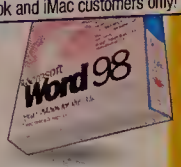
- Timesheet functions
- Generates customizable estimates
- Automated job costing
- Previous data from QuickBooks or Quicken is automatically updated to QuickBooks Pro 4.0!

Intuit

Microsoft Word 98

Special Edition! For iBook and iMac customers only!

Only $89.95!* after rebate Item #WP3072



Includes Word 98, Internet Explorer 4.5 and Outlook Express 4.5.

*Price AFTER publisher's $30 mail-in rebate. Before rebate: $119.95. Rebate coupon in box. Offer expires 7/31/2000.

MICROSOFT OFFICE 98

Microsoft

Includes:
• Word 98 • PowerPoint 98
• Excel 98 • Outlook Express.

Upgrade only $249.95! Item #UPG0778

crosoft Office 98 Full Version
S1150 ..... $419.95

EPSON STYLUS COLOR 740i PRINTER

- Blueberry cover standard
- 1440 x 720 dpi with smaller ink drops • 6ppm blk; 5ppm clr
- USB/Mac serial compatible

Other color covers available for only $14.95 each! Call for details.

EPSON

Only $129.95!* after $50 rebate Item #PR15063

*Price BEFORE manufacturer's $50 mail-in rebate is $179.95–$50 rebate=$129.95. Rebate coupon available at www.warehouse.com/rebate/epson, or call us at 1-800-390-0706 to request one. Offer expires 7/31/2000.

Black Ink Cartridge: PA1582.....$25.99

eases are available to business customers with approved credit on product orders where at least one product totals $750 or more. Payments are based on a 48-month Lease. Leasing terms bject to change without notice. Call for complete details. Other leasing terms available.

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Only $449!

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Features Web Clipping to retrieve stock quotes, and other Internet* information.

*Internet access requires activation and a monthly Palm. Net service fee. Service provided by 3Com

Palm VII

New! Olympus D-360L

Only $299.95!

Item #IN8569

1.3 MEGAPIXEL!

OLYMPUS

- 2x digital zoom • 8MB Smartmedia card included
- 1.3 Megapixel • 1.8" Ultra-bright color LCD

SupraExpress V.90 56K* Modem

Only $78.99!**

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- 56K ITU Standard
- 230Kbps throughput
- Voicemail/Caller ID

*Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.

HP LaserJet Printers

HP LASERJET 8000N
Only $2449!
Ask for item #PR13724.
Lease it for $71/mo.§
- Prints 24ppm • 1200 dpi max. resolution
- 133MHz RISC processor

hp invent

HP LASERJET 8000 SERIES BLACK TONER CARTRIDGE
Only $154.99 ea.
Item #63223

HP LASERJET 2100M
- Prints 10ppm
- 1200 dpi resolution
- HP PostScript Level 2
- LocalTalk connectivity

HP LaserJet 2100M
$749!
Item #PR14691

HP LASERJET 2100 SERIES BLACK TONER CARTRIDGE
Only $89.99 ea.
Item #PA1871

HP LASERJET 8100 SERIES BLACK TONER CARTRIDGE
Only $178.95 ea.
Item #PA1662

HP LASERJET 8550 SERIES BLACK TONER CARTRIDGE
Only $99.99 ea.
Item #PA1644

HP LASERJET 4050N
Only $1507.95
Ask for item #PR14947.
Lease it for $44/mo.§
- Prints 17ppm
- 1200 dpi maximum resolution
- 100MHz RISC processor
- Ethernet 10/100Base-TX

HP LASERJET 4050 SERIES BLACK TONER CARTRIDGE
Only $85.99 ea.
Item #PR13025

HP LASERJET 5000 SERIES BLACK TONER CARTRIDGE
Only $139.99 ea.
Item #PR13742

HP LASERJET 8100N
- Prints 32ppm • 1200 dpi

Item #PR14315 .....Lease it for $80/mo.§ $2779.95

HP COLOR LASERJET 8550N
- Prints 24ppm blk/6ppm color • 600 dpi

Item #PR16146 .....Lease it for $158/mo.§ $5555.95

HP LASERJET 5000N (not shown)
- Prints 16ppm • 1200 dpi • Prints 3" x 5" thru 11" x 17"

Ask for item #PR13443 .....Lease it for $57/mo.§..... $1969.95

MAC OS 9

Only $99.95!

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FREE** iTools from Apple with purchase of Mac OS 9!

Features you'll love!

- Sherlock 2: Easily find people, news, and shopping on-line!
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- Built-in Open GL for accelerated 3-D graphics and an improved gaming experience

*3.95 shipping & handling applies.
**iTools is free to Macintosh® users running the Mac OS 9 operating system, and can be accessed at www.apple.com. See box for details.

PLUS...

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SONY G500 21" MONITOR

SONY

- 21" screen (19.8" viewable)
- .24mm aperture grille pitch
- 2048 x 1536 @ 75Hz with adapter

Only $1129!

Item #MON1041

IOMEGA 100MB ZIP DISKS

New Low Price! $8.99! each, in 20-pack

Item #BND3616

100MB Zip Disk Gray (20-pack) BND3616 ..... $179.80

100MB Zip Disk Color (10-pack) BN5265 ..... $99.95

FREE Zip Storage Tower when you buy any Zip Disk 10-pack! While supplies last. Item #AA1780.

Fuji CD-Rs

Only 99¢ each, in 50-pack spindle

Ask for item #ME8599

- 74 min. • 650MB

FUJIFILM

3Com U.S. Robotics 56K* V.90 FaxModem

Only $99.99!

Ask for item #DMD3448.

- Manufacturer's lifetime warranty

*Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.

Amazon Inkjet Cartridges

As low as $22.95! each, in 4-pack

FREE* InkJet Cartridge with the purchase of an inkjet cartridge 4-pack.

4-Pack Black Ink cartridges for Epson Stylus Color 740/740i/1160: Item #PA2315 ..... $91.80
4-Pack Color Ink cartridges for Epson Stylus Color 440/640/740/740i/1160: Item #PA2317 ... $91.80
*Free cartridge shipped in package.

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500MHz PowerBook G3s!

FREE! *64MB RAM UPGRADE!

after rebate, when you purchase an Apple PowerBook!

Ask for item numbers #AAP1124 and INSTL10. Installation fee required.

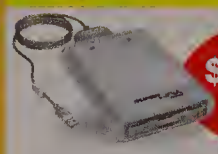
- Up to 500MHz PowerPC G3 processor
- Up to 128MB PC100 SDRAM (expandable up to 512MB)
- 6X DVD-ROM drive
- Up to 12.0GB Ultra ATA/66 hard drive
- 56K V.90 modem
- 1MB Backside Level 2 Cache
- 14.1" active-matrix display
- Support for optional AirPort card for wireless connection to your network or the Internet
- Two 400Mbps FireWire® ports
- Two independent 12Mbps USB ports

NEW! PowerBook G3/400MHz processor
• 64MB SDRAM • 6.0GB Ultra ATA/66 HDD • DVD-ROM
• 2 FireWire® ports
CPU1580 ..... Lease it for $73/mo.§ $2499

NEW! PowerBook G3/500MHz processor
• 128MB SDRAM • 12.0GB Ultra ATA/66 HDD • DVD-ROM
• 2 FireWire® ports
CPU1581 ..... Lease it for $102/mo.§ $3499

Order Online at www.macwarehouse.com

120MB USB SuperDisk Drive



Only $129.95!* after rebate

Item #DRI3350

- Reads and writes 3.5" floppies
- USB & Hot-Swappable!

IMATION

120MB SuperDisk Media 10-pack, only $69.90** (only $6.99 ea.), #BND3239.

*Price AFTER manufacturer's $20 mail-in rebate. Before rebate: $149.99. Rebate expires 6/30/2000.
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Rebate coupons are available at www.warehouse.com/rebate/imation or call 1-800-390-0706 to request them.

Targus Universal Notebook & Printer Case

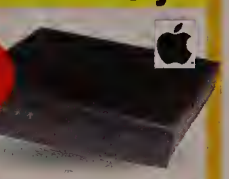
Only $69.95!

Item #AC28478

TARGUS

- Two individual padded compartments that measure 11" x 13" x 2.5"

PowerBook G3 Battery



As low as $139.95!

Item #ACC3728

- Lithium-Ion

ACC3728 (fits new 1999/2000 models), only $139.95
ACC3307 (fits 1998 models) shown, only $199.95

56K* PC Card FaxModem

Only $149.95!

Item #DMD3824

- K56 Flex and V.90 technology
- Send, receive, view, print, and manage faxes right from your PowerBook

*Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.

GLOBAL VILLAGE COMMUNICATION

FireWire 2 Go

Add FireWire to your PowerBook G3!

Only $139!

Item #DRI3505

Fits in CardBus slot

newer technology!

NEW SPECIAL EDITION iBOOK

- 366MHz PowerPC G3 processor
- 64MB SDRAM • 56K modem
- 6.0GB Ultra ATA hard drive
- 24X max. variable CD-ROM
- Integrated ATI RAGE Mobility 2D/3D Graphics Accelerator with 2X AGP
- Supports Airport™ wireless networking (Airport Card and Base sold separately)

Apple iBook 366MHz G3

$1799!

Lease it for $52/mo.§

Item #CPU1579

FREE* 64MB RAM! after rebate. Installation fee required. Ask for item numbers #AAP1113 and INSTL10.

Cool graphite color!

NEW 300MHZ iBOOK G3

- 300MHz PowerPC G3 processor
- 64MB SDRAM • 56K modem
- 6.0GB Ultra ATA hard drive
- 24X max. variable CD-ROM
- Integrated ATI RAGE Mobility 2D/3D Graphics Accelerator with 2X AGP
- Supports Airport™ wireless networking (Airport Card and Base sold separately)

Apple iBook 300MHz G3

$1599! ea

Lease it for $47/mo.§

Blueberry: #CPU1577 Tangerine: #CPU1578

FREE* 64MB RAM! after rebate. Installation fee required. Ask for item numbers #AAP1113 and INSTL10.

POWERBOOK G3 PC100 MEMORY

- New PC100 100MHz memory upgrades for 400MHz and 500MHz G3's

128MB PowerBook G3 Memory

$299.95! each

Item #CHP1065

Memory prices subject to change.

AIRPORT CARD & STATION

- Transmits up to 150 feet
- Speeds up to 11MB per second

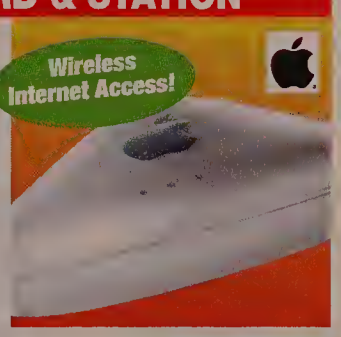
AirPort Card for iBook, only

$99!

Item #DEC4142

AirPort Base Station for iBook (shown) Item #DEB2777 ..... $299

Wireless Internet Access!



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Adobe Photoshop 5.5

Adobe

Apple • 3Com • Global Village • Maxell • Mitsubishi • Iomega • Microtek

Olympus C-2020 Digital Camera

4 "AA" NiMH Batteries, Remote, and 8MB Card Included!

New Low Price! Was $899.95: Now only $699.95!

Item #IN8346

OLYMPUS

- 2.1 Megapixel
- 3X optical zoom • 1600 x 1200 ppi res.
- QuickTime movie mode (up to 60 seconds)

Olympus P330 Stylus Photo Printer, ask for item #PR14784, only $399.95

64MB SmartMedia Cards

New! Only $179.95!

Item #MY12482

- Digital film for digital cameras
- Compatible with new digital cameras with SmartMedia slot

Microtek ScanMaker 4

Only $599.95!

Item #IN8332

- 36-bit color
- 600 x 1200 dpi
- Built-in transparency & slide bay
- 8.5" x 14" scanning area

FREE Snaptrans templates included!

MICROTEK

Imation CD-Recordables

Only 89¢ each in 100-pack

Item #ME8572

While supplies last!

IMATION CD-R 650MB/74MIN

IMATION 3M

Palm Vx Connected Organizer

New Low Price! Was $429: Now only $399!

Item #BN7020

- New sleek design
- 8MB of memory

Palm Vx Connected Organizer

Apple 333MHz iMacs

Authorized Catalog Reseller

only $799!* each

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APPLE 333MHZ IMACS: 5 COLORS TO CHOOSE FROM!

- 333MHz PowerPC G3 processor
- 32MB SDRAM (256MB max.)
- 6.0GB hard drive
- 24X max. variable CD
- 56K modem
- 15" color monitor

Lime: Item #RCPU1338
Grape: Item #RCPU1337
Tangerine: Item #RCPU1340
Blueberry: Item #RCPU1336
Strawberry: Item #RCPU1339

RECONDITIONED

G3 PowerPC

Blueberry, shown.

Apple iMac 350MHz

- 350MHz • 64MB SDRAM
- 6.0GB HD • 24X max. CD-ROM
- 56K modem • 15" monitor

Blueberry only $899!*

RECONDITIONED

Item #RCPU1492

Apple iMac 400MHz DV

- 400MHz • 64MB SDRAM • 10.0GB Ultra ATA HD
- 4X DVD-ROM • 56K modem • 15" monitor

Only $1199!* ea.

RECONDITIONED

Blueberry: #RCPU1493 • Grape: #RCPU1494 • Lime: #RCPU1496 • Strawberry: #RCPU1495 • Tangerine: #RCPU1497

Apple iMac DV Special Edition

RECONDITIONED

- 400MHz • 128MB SDRAM
- 13.0GB Ultra ATA HD • 4X DVD-ROM
- 56K modem • 15" monitor

Graphite only $1399!*

Item #RCPU1498

*Reconditioned system. Reconditioned computers may not include original application software. 90 day parts and labor warranty. All sales final. While supplies last. Free memory offer does not apply.

POWER MAC 7200/90MHZ

- 90MHz PowerPC 601 processor
- 16MB RAM • 500MB HD
- 4X max. variable CD-ROM
- 3 PCI Slots

Only $399!*

Item #RCPU1471

*Reconditioned system. Reconditioned computers may not include original application software. 90 day parts and labor warranty. All sales final. While supplies last.
Monitor and keyboard not included.
Free memory offer does not apply.

Reconditioned

POWERBOOK G3 333MHz

- 333MHz PowerPC G3 Processor
- 64MB RAM • 4.0GB HD
- 24X max. variable CD-ROM
- 2 USB ports

Only $1899!*

Item #RCPU1359

*Reconditioned system. Reconditioned computers may not include original application software. 90 day parts and labor warranty. All sales final. While supplies last.

Free memory offer does not apply.

Reconditioned

DIAMOND PRO 900u 19" MONITOR

MITSUBISHI

- 1600 x 1200 @ 75Hz
- 18" viewable size
- .25 aperture grille
- Manufacturer's 3-year warranty

Only $610.95!

Item #MON0765

Flat Screen CRT!

VIEWSONIC P810 21" MONITOR

ViewSonic on top

- 21" monitor (20" viewable)
- 1800 x 1440 @ 73Hz
- .25mm dot pitch

Only $828.95!

Item #MT3320

Ideal for graphic applications!

PAGE 7 OF 8

Jaz 2.0GB Cartridges

FREE* Jaz cartridge carry case with 3 pack purchase. #AA1753

Only $99.95! each, in 3+ quantity

Ask for item #MED0508.

Quantity:	1-2	3+
Price:	$124.95 ea.	$99.95 ea.

*Limit 1 per customer. While supplies last. Ask for Item #AA1753.

iomega

Epson ELP 5700i Laser Printer**

Only $349.95!* after mfr's $50 mail-in rebate

Ask for item #PR15675.

- 8ppm • Up to 1200 dpi • USB compatible only

*Price BEFORE mfr's mail-in rebate is $399.95 – $50 rebate = $349.95. Rebate coupon in box. Offer expires 6/30/2000.
**Optional blueberry or grape cover available. Redeem through mfr's mail-in coupon in box.
Black Developer Cartridge, only $99.95, item #PA2359

EPSON

Global Village 56K* Teleport Internal Mac Modem

Only $59.99!

Ask for item #DMD4267.

*Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.

WAREHOUSE.com

Upgrade for as low as $109.95!

after $70 rebate. Item #UPG1049

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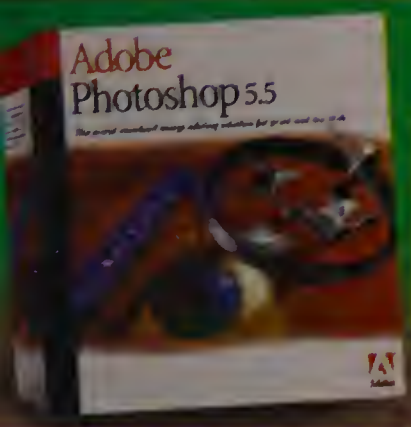

Adobe Photoshop 5.5

Upgrade only $109.95!* after rebate for previous owners of Photoshop 5.0 and ImageReady 1.0

- Multiple undo: Quickly undo or redo several steps.
- Magnetic Tools: Precisely follow the edges of an image.

Adobe

Ask for Item #UPG1049.

Adobe Photoshop 5.5 Upgrade (from Photoshop v4.0 or earlier) UPG1049 ..... $179.95

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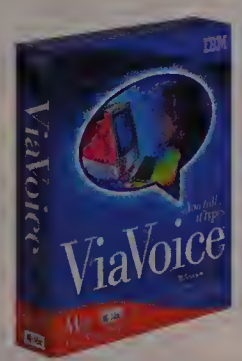

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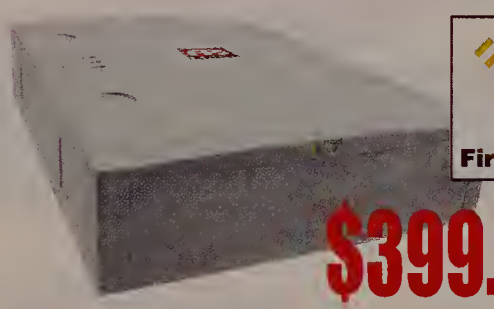

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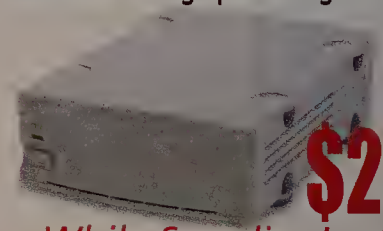

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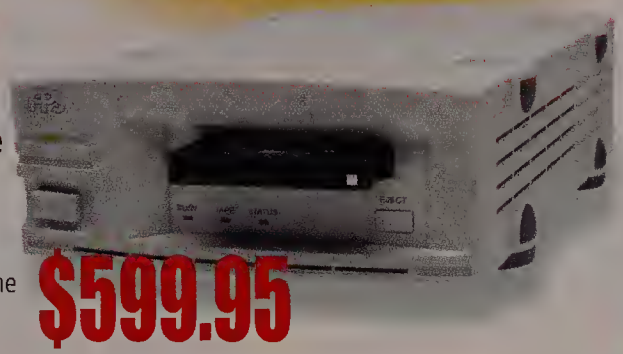

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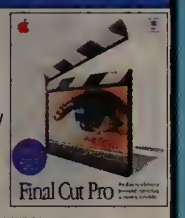

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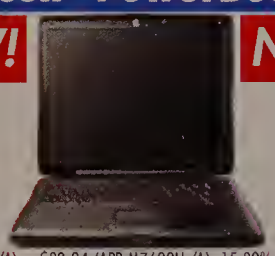

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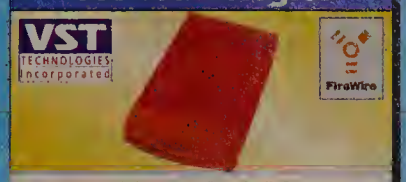

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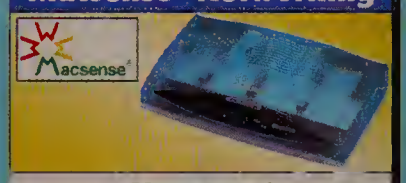

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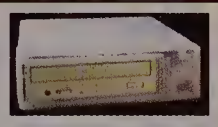

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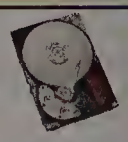

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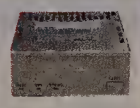

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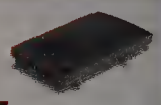

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Ultra 160 SCSI				
9.2GB	7200	2MB	ST39236LW	$239
9.2GB	7200	4MB	ST39236LWV	$250
9.2GB	10,000	4MB	ST39204LW	$354
18.4GB	7200	2MB	ST318436LW	$355
18.4GB	7200	4MB	ST318436LWV	$375
18.4GB	10,000	4MB	ST318404LW	$539
36.7GB	10,000	4MB	ST336704LW	$929
36.7GB	10,000	16MB	ST336704LWV	$959
73.4GB	10,000	4MB	ST173404LW	$1599
73.4GB	10,000	16MB	ST173404LWV	$1629
IDE Ultra ATA/66				
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10.2GB	7200	2MB	ST310210A	$Call
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18.1GB	12.5mm	Toshiba	MK1814GAV	$369
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NEC	CDR3010	40X	85ms	$72
Toshiba	XM6401B	40X	85ms	$79
Plextor	PX40TS	40X	85ms	$98
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Teac	CD540E	40X	85ms	$46
NEC	CDR3000	40X	75ms	$48
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Creative	SBCD52	52X	100ms	$55
Kenwood	UCR412	52X	90ms	$86
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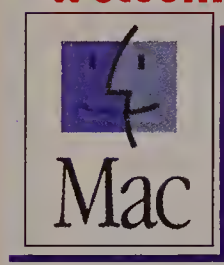

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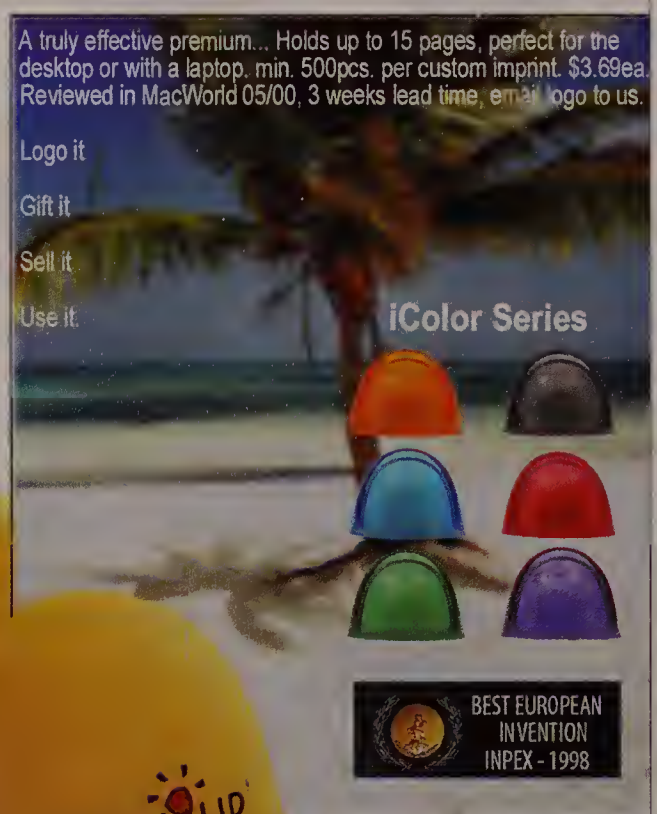

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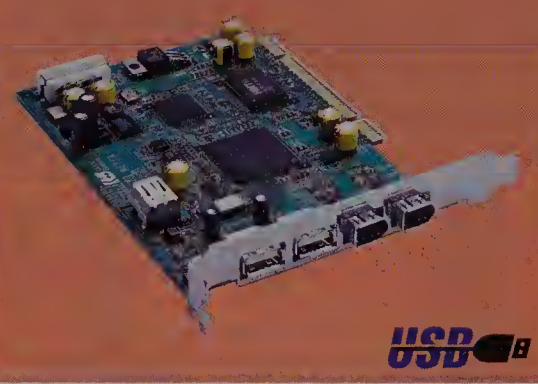

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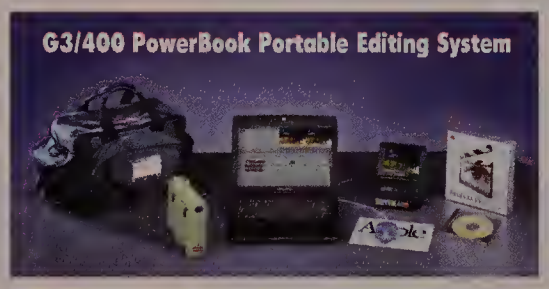

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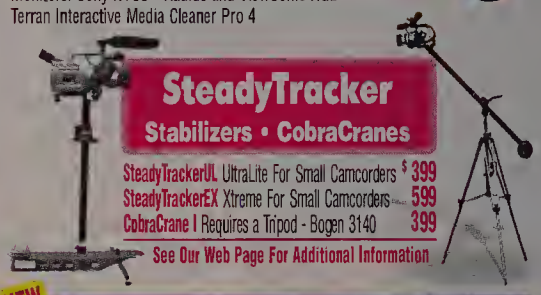

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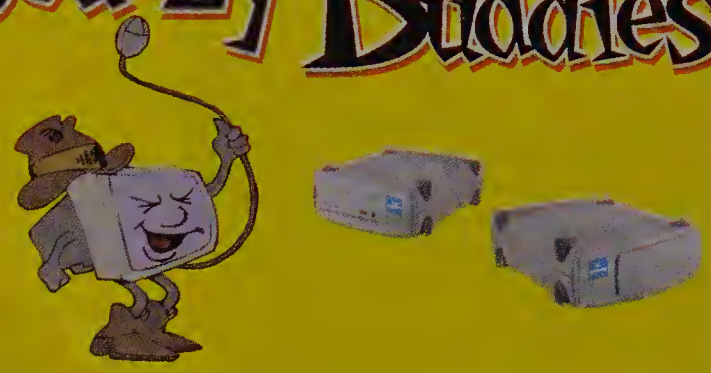

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PRODUCT INDEX

Category	Page No.
Business Operations	**153-154**
Bar Code	
Inventory Management	
ISP	**153-154**
Web Hosting	
USB	**155-157**
Education/Entertainment	**158-159**
Discount Software	
Peripheral Products	**158-159**
Cables	
CD Rom	
Digital Media	
Magnetic Media	
Printing Supplies	
Systems & Peripherals	**159-165**
Memory & Upgrades	**166-169**
Services	**169-171**
Data Recovery	
Digital Production	
Printing	
Repair	
Classifieds	**171**

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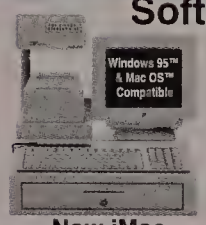

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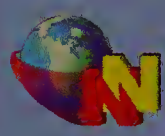

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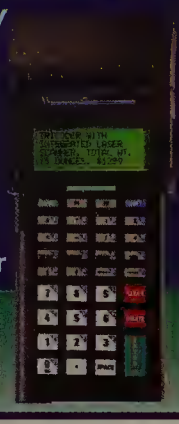

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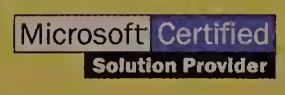

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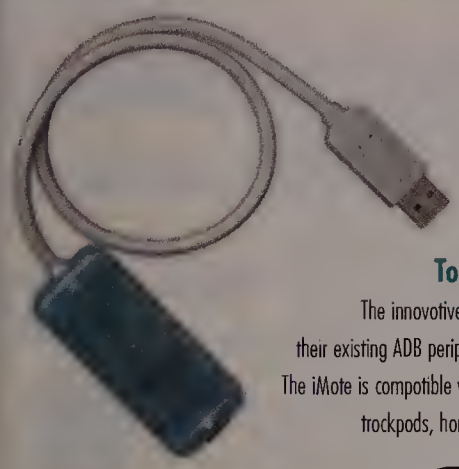

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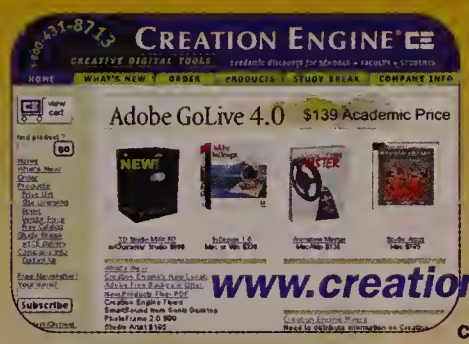

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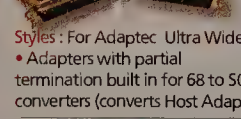

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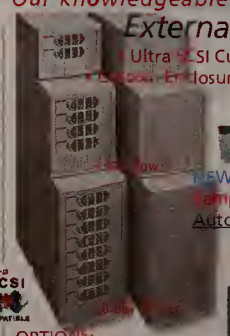

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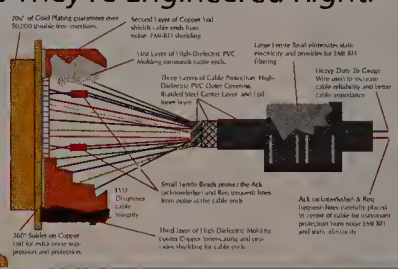

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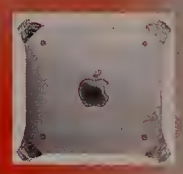

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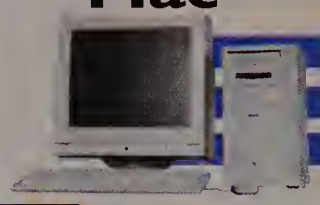

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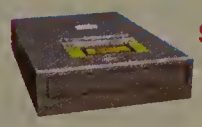

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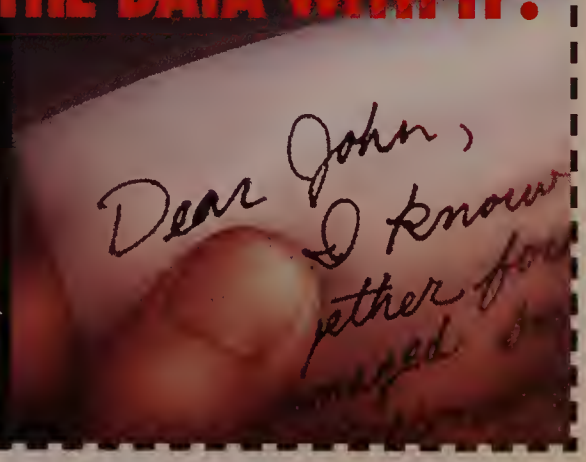

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The Desktop Critic

by David Pogue

The Night before X-Ness

ON THE EVE OF MAC OS X'S RELEASE, JUST HOW MUCH PANIC IS JUSTIFIED?

MOST STAGE PERformers would be delighted to turn in a performance that had people talking a week later. But at January's Macworld Expo, Steve Jobs unveiled Mac OS X—and gave a performance that had the Mac community reeling for *months*. Here was a radically different OS—one whose underpinnings were based on Unix, the same system that runs your bank, airlines, and government—that looked like the gorgeous, futuristic offspring of Kai's Power Goo and Colgate's Berrylicious toothpaste. To this day, many Mac fans' euphoria and fear show no signs of abating.

To see what all the fuss is about, visit www.apple.com/macosx/aqua.html for some pictures and movies of this new interface (named Aqua). While you're online, visit some of the Web sites that take a critical look at the new design. They include the mostly pessimistic thoughts of interface guru Bruce Tognazzini (www.asktog.com:80/limit.html) and the mostly optimistic thoughts of "iGeek" columnist David Every (www.macweek.com).

The thing is, most of the criticism concerns the Aqua *look*—not Mac OS X as a whole. That's like critiquing the deck chairs on the *Titanic*. When Jobs did his demo, a sudden panic struck observant audience members: in Mac OS X, *there's no hard drive icon* on the screen! In fact, *no* icons show up on the desktop when you insert disks. Instead, you have to click on an icon called Computer to see your disk icons.

What is this—Windows? Suddenly the Mac faithful became intensely aware of just how different Mac OS X is going to be. It's a completely new OS, lacking many of the standard Mac features we've come to love.

Ever since that day, I've spent a lot of time studying Apple's demos, querying developers, and asking questions of experts such as Scott Anguish, who runs the Stepwise Web site for Mac OS X developers (www.stepwise.com) as well as its free mailing list. Here are the answers I've unearthed. Consider this an effort to quell the panic—or rather, to direct it at issues *really* worth worrying about.

Let's start with extensions; they're unequivocally gone in Mac OS X. Good riddance, I say; extensions are the biggest cause of instability and crashes. In their place are more rugged Mac mechanisms that resemble background applications—and can't lock up your machine.

The Apple and Application menus, the two screen cornerstones of the current Mac OS, disappear in Mac OS X, too. In their place, Apple offers the Dock—a row of icons at the bottom of the screen. You install new "Apple menu items" by dragging their icons onto the Dock; you also switch between *running* programs by clicking on their Dock icons. This is the part Apple will have to fix. Mac OS X does away with almost every Mac OS 9 compact file-listing mechanism: the Control Strip, pop-up windows, Application Switcher, Launcher, and of course the Apple menu. The Dock is only one layer deep. It can't come close to replacing all of those other organizing structures.

Then there's the desktop—yes, the glorious place mat that has defined the Mac for so many years. As OS X stands now, the desktop is gone. The only things you can put onto your screen backdrop are aliases; you can't save or download files directly onto it. Because there's no real desktop, you also lose such features as clipping files, Internet location files, and desktop printer icons. And speaking of icons, labels and custom icons are apparently history, too.

Now, Apple's entire purpose in creating Mac OS X was to build the most stable, trouble-free OS in the world. If one Mac OS X application crashes, your others keep flying high; thanks to OS X's Unix-like underpinnings, the days of restarting the Mac after a crash are over.

So the real question is, How much are you willing to sacrifice in order to gain the juicy stability (and the stunning animated visuals) of Mac OS X? How badly will you miss the familiar features that are different or absent in Mac OS X?

I'm not among the panickers; there are still plenty of reasons for optimism. First, the finished Mac OS X is still months away; nothing is set in stone. Second, Apple may not care what we, the users, think—but it *does* listen when software companies and huge accounts grumble, which they'll certainly do if they find Mac OS X less productive. Third, the shareware programmers of the world are likely to fix Mac OS X's shortcomings within weeks of its release. And finally, Mac OS X isn't the end of the line. Apple will have another chance to get it right—in Mac OS X.I. **m**

DAVID POGUE (davidpogue.com) will write *Mac OS X: The Missing Manual* (Pogue Press/O'Reilly, 2000) as soon as there's an OS to write about.

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